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Journal of ARIZONA MEDICAL ASSOCIATION

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(1) Mosenthal, H. O.: Management of Diabetes Mellitus: An Analysis of Present-Day Methods of Treatment, Ann. Int. Med., 29:79 (July) 1948.

(2) McLester, J. S.: Nutrition and Diet in Health and Disease, 5th ed., Phil., W. B. Saunders Company, 1949, page 364.

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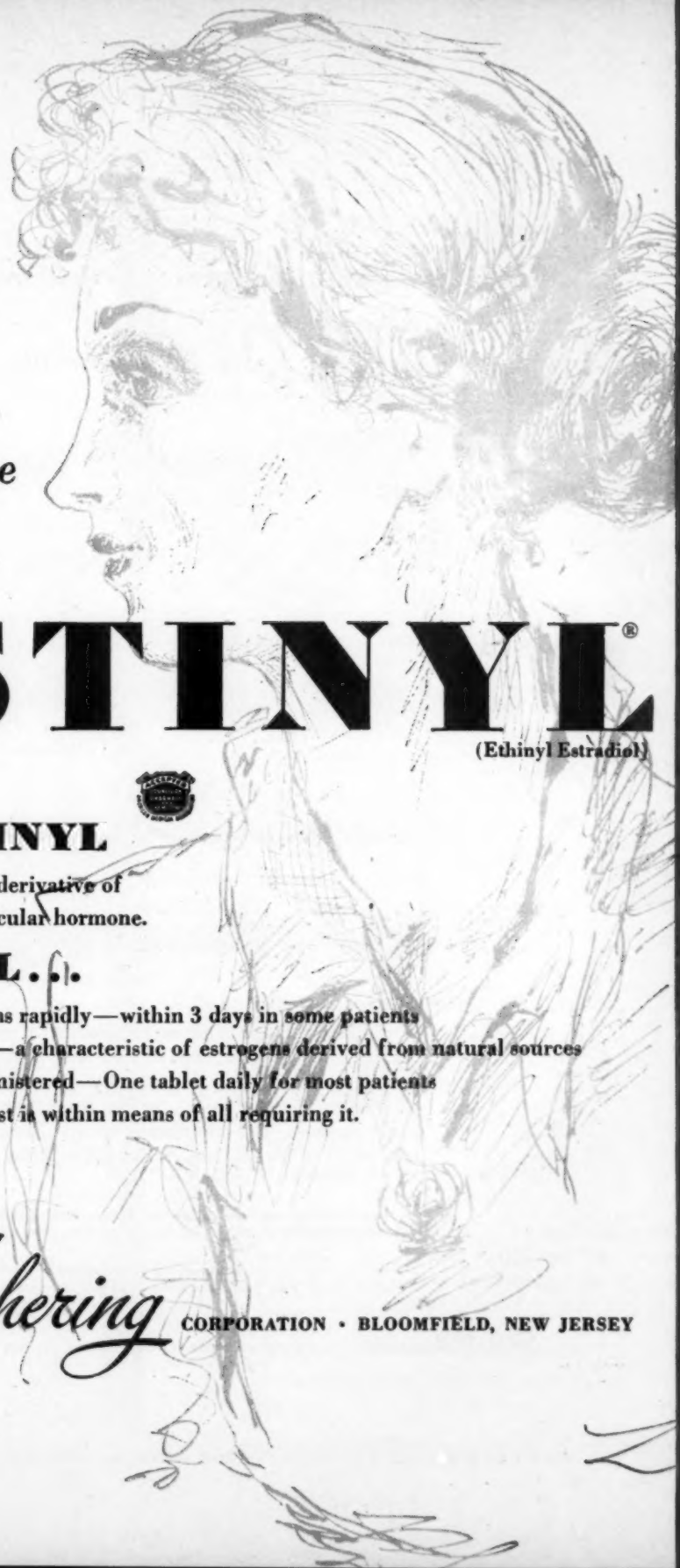

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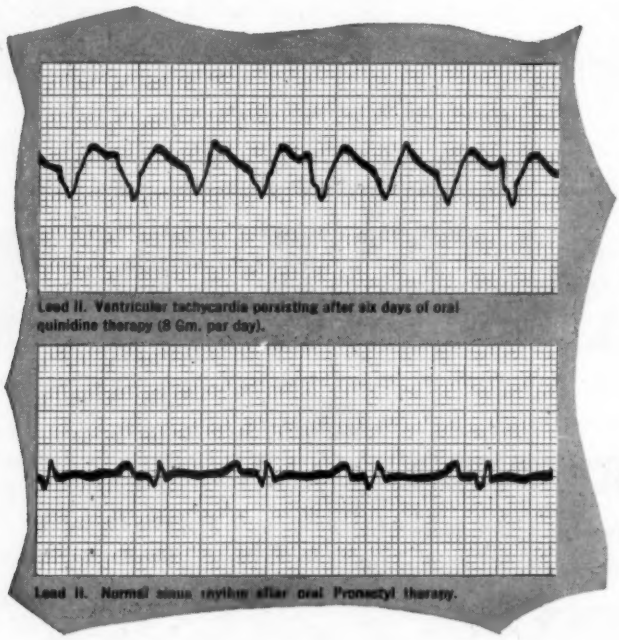

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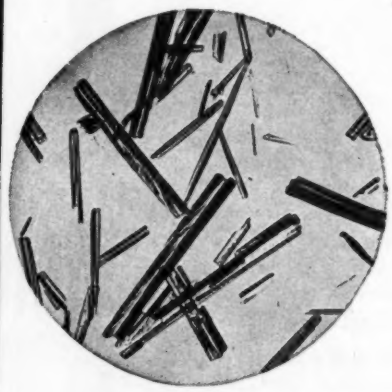

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1. LENR, D. (1950), RELATIVE MERITS OF COMMONLY USED SULFONAMIDE DRUGS AS COMPONENTS OF MIXTURES, N. Y. STATE J. MED., 50:1361, JUNE.

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1. Dennison, A.D.: *Jour. Med. Soc. New Jersey*, 46:139, Mar., 1949.
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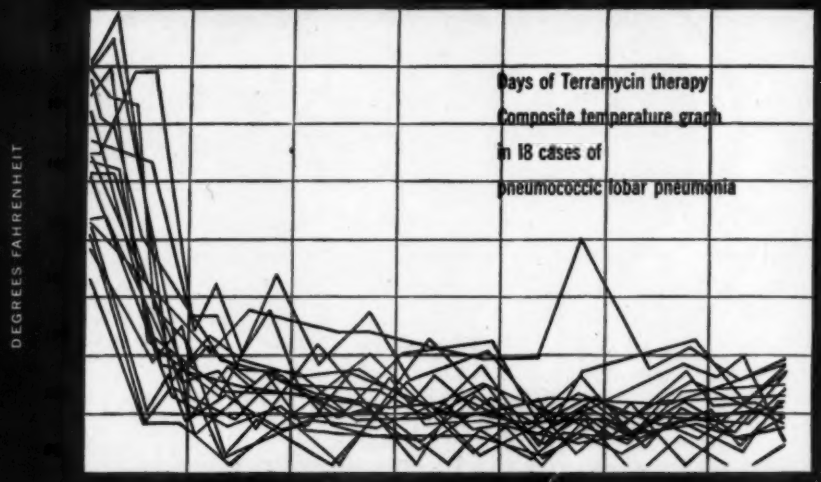

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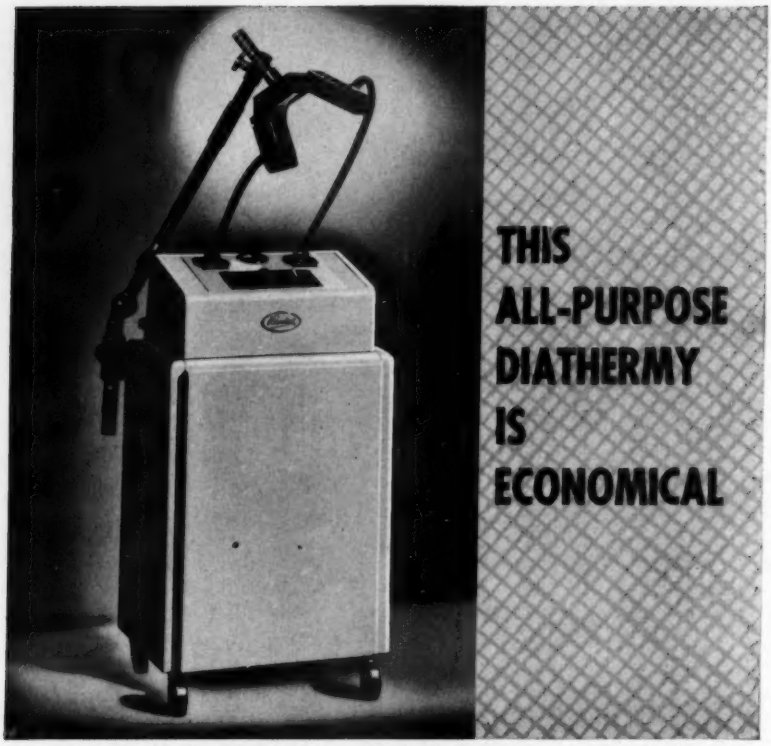

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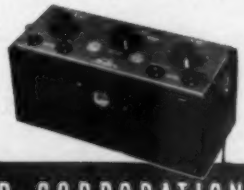

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ARIZONA MEDICINE

Journal of ARIZONA MEDICAL ASSOCIATION

VOL. 8, NO. 2 FEBRUARY, 1951

PLASTIC SURGERY FOR THE GENERAL SURGEON

W. R. MANNING, M.D., F.A.C.S.*

Tucson, Arizona

Plastic surgery might well be defined as being that specialty of surgery dealing with the restoration of defects both congenital or acquired which improve function and esthetic effect. It is therefore obvious, that there are a great many plastic surgical procedures used daily by the general surgeon as well as in other surgical specialities that might be termed plastic surgery. It becomes quite apropos that we discuss those principles of this particular field which might apply to general surgery, enabling us to do more for our patients.

One of the basic principles of plastic surgery is the interpretation of defects or disfigurements in terms of tissue loss, distortion and functional involvement. The preoperative planning of any surgical procedure should entail careful and thorough examination in order to estimate not only the loss of tissue but what tissues are involved as well as the degree of functional impairment. The general surgeon daily studies these problems in relation to practically any type procedures that he might carry out in regard to placement of incision, the approximation of tissue layers, the correction of distortion or tension.

Transplanted tissues should morphologically always resemble as close as possible the tissue which it is to replace. This applies to fascia, skin, mucous membrance etc. Skin transplants should be selected from an area which approximates the original as nearly as possible in regard to color, texture, thickness, as well sa hair distribution. Another principle is that the repair of the defect must not produce another defect equally as great. This sounds as if it is a very simple and obviously understood principle, and yet there are a great many attempts at repair which have resulted in disfigurement far greater than the original injury or defect.

A word should be said as to psychological considerations. There is no relationship existing between a persons physical defect and his reactions to it. Frequently we find patients with but a slight facial or bodily disfigurement who suffer a great deal more mental distress than those whose defects are severe and pronounced. Psychiatric consultation has been used and should be used more freely when a surgeon is confronted with a patient whose defect might be a reflection of a psychological state.

Besides the complete understanding of the patients personality and his disfigurement or defect, one should make sure that the patient himself realizes the need for plastic surgical correcrection as well as the difficult and meticulous work that is to be required to correct such disfigurement. A patient who cooperates 100% makes the practice of surgery a pleasure. Photographic record should always be made both before and after operation and all views should be taken, particularly in color, in order to have a very definite and lasting impression in the file of the patient.

Preoperative Preparation

Preparation of the skin for operative procedures should utilize mechanical cleansing with soap and water and preferably 48 hours prior to surgery. The skin should not be stained by one of the colored antiseptics inasmuch that it removes the true color of epidermis as well as the faint lines that are so frequently used in the transposition of skin. Cyanosis is another factor that should not be masked and one of the clear antiseptics is preferable.

*American Board of Surgery. Read before Arizona State Medical Society, annual meeting, Phoenix, Arizona, May, 1950.

The preoperative preparation should pay careful attention to shaving of the skin so that such skin is not inadvertently nicked in the shaving process, and so that the exact position of all hair and point of hairline is noted and kept in mind by the surgeon. In working about the head, the eyebrows should NEVER be shaved. I have had occasion in the past two years to have seen three cases wherein the eyebrows were shaved by resident physicians in the hospital and to date these eyebrows have not returned. There remains in their place only a very short stuble which will take many years to grow to its normal length if it ever does produce normal hair length.

In immediate repair of lacerations nothing takes the place of thorough cleansing, copious lavage and careful debridement.

Instruments

While we seem to be talking about the field of plastic surgery as it is known as a specialty, we are actually speaking of the general surgeon who should be cognizant of simple plastic surgical principles, and the means to obtain equal results. In my opinion nothing can surpass fine instruments in this type of work. The skin can be handled freely providing one does not traumatize, which means that the mousetooth tissue forceps should be of a fine character, ordinarily one and two teeth. The G. B. New or the Adson pickups are admirable for this work.

Needles need not be many in character or type and two of the most generally acceptable are of an Anchor brand, one heavier for the buried catgut listed as an 1844-4, the other for the skin and listed as 1831-3. A very excellent adjunct in the help of handling skin is the use of dural-hooks. When working about the face one should handle the skin as little as possible and these dural hooks serve admirably for positioning skin.

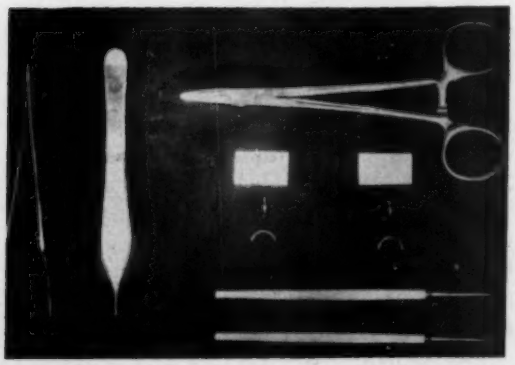

Fig. 1—Illustrating basic instruments essential in fine plastic technique—"pickups", needle holder, dural hooks and fine needles.

The knife blade should always be sharp and a new blade used quite frequently. It is absolutely essential that as straight and as right angle an incision as possible is made when going through skin. The number 15 blade is the most universally used.

Suture material should be as fine as a man can work with and depends entirely upon the area in which the work is being done. For the buried suture, it is my practice to utilize 4 or 5-0 catgut to approximate the fatty layer and utilize such catgut in the subcuticular layer which will slightly evert the skin edges and give coaptation without tension. Silk for the skin is my own personal preference although nylon, horsehair, cotton and steel are used by many men. In working about the face 5-0 and 6-0 depending upon the exact site of the approximation necessary are most commonly used. About the neck perhaps 4-0 is most universally used. Certainly nothing any larger than 4-0 should ever be used in any situation other than when the skin is extremely thick. If one desires to be exceptionally particular relative to coaptation, a subcuticular continuous steel wire threading from one side to the other as a pullout can be used although if the fine silk sutures are removed within 24-36 hours no stitch holes will ever remain.

The skin grafting instrument used depends upon ones own choice. My own preference, simply because I have used it the longest, is the Padgett-Hood Dermatome. I have had occasion to use the Reese Dermatome which carries with it the dermatape and is admirable for pattern grafts. Brown's electric knife is very excellent although I have had no personal experience with it, nor have I had with the Vacutome. Free handcutting with the Ferris-Smith, the Blair knife, are perfectly acceptable but again it is an individual variant as to proficiency of the operator.

Subcutaneous Closure

Prerequisite to any skin approximation is the closure or coaptation done beneath the skin level which is the most important part of any plastic surgical procedure directed toward the establishment of a fine scar. The fat layer should be obliterated by interrupted buried catgut,

utilizing 4 or 5-0 or if one chooses the same size of cotton, silk or steel. The subcuticular stitches should be placed with an inverted type knot which is buried, utilizing very fine material, and allowing the skin to fall together.

The suture material in the epidermis itself is used only for very fine eversion and approximation and can all be removed within 24-36 hours. If a wound is approximated in its deeper layers with minimum and yet adequate amount of approximating material, the skin edges should require no tension whatsoever. The epidermis should have its cut edges slightly everted and there will be no necessity for bridging by fibrosis.

The skin suture should be placed closely together and on the face it is recommended that a suture be placed no further than 3/16 of an inch apart having the knot on the side rather than across the wound edges. The sutures are placed so that there is no strangulation which can easily be identified by blanching at the point of entrance and exit of the suture material. It is helpful, I feel, particularly in wounds about the face, that no dressing be applied unless such is necessary from the standpoint of compression, as in skin grafting or with undermining.

The wound should be kept uncovered and the nurses instructed to free all serum from the wound particularly overlying the incision itself. Serum has a tendency to collect between the wound edges causing expansion and requires that approximation depends upon absorption of serum and replacement of fibrous material. Also, if the wound is kept clean from clotting or scabbing, there is less tendency for contamination than when sealed over by such excrement. The sutures are removed about the face—½ in 24 hours—the remainder in 36, but with collodion or other bridging type dressing applied to continue support. If such incision is about the eyelids then closure and immobilization is effected by dressing to include not only the eyelid involved but both eyes.

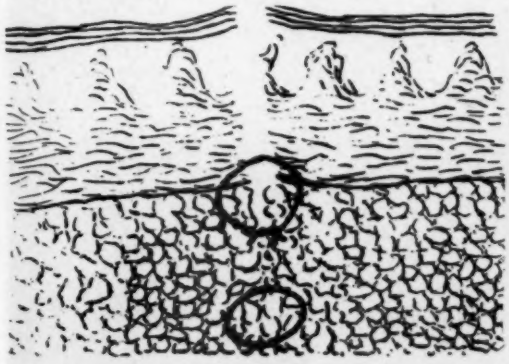

Fig. 2—Showing placement of subcutaneous inverted suture. Note inclusion of only minute amount of lowermost dermis. Relieves tension on skin suture.

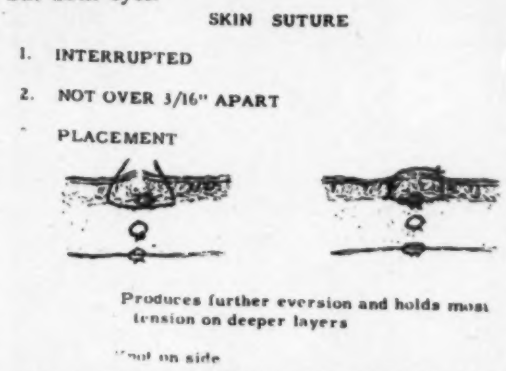
SKIN SUTURE
1. INTERRUPTED
2. NOT OVER 3/16" APART
PLACEMENT
Produces further eversion and holds most tension on deeper layers

Fig. 3—Placement of skin suture. Note that the deep portion of suture holds most tension.

Fig. 4—Severe left temporal laceration at time of injury.

Langer's Lines

One of the most beneficial of all means we have of assuring ourselves of a minimal scar, is to place our incisions following Langer's lines. These lines have been carefully worked out

Fig. 5—Appearance at 24 hours. ½ sutures removed at this time.

Fig. 6—Final appearance at 4 weeks. Scar hardly visible.

many years ago and have been confirmed in recent years by various authors. The theory is based upon the fact that the skin lines which are tension lines parallel the pull of the underlying muscles. Therefore ,if one places the incision paralleling such tension lines, the pull will be along the line of incision rather than across it and will prevent retraction due to such muscle tension. There is one word of caution that should be observed and that is about the mouth and face the lines vary somewhat. It is very difficult to determine exactly how these skin lines vary although if one will ask the patient to purse the lips and show the teeth etc., going through all the various maneuvers of the facial musclature, one can see quite readily the lines that should be followed when an incision is to be placed on the face.

Skin Grafting

Grafting of skin is one of the most universal means we have of covering a defect whether it be traumatic or surgical. The skin, as we all know, can be cut to various thicknesses and anyone with a little patience and minimal amount of mechanical ability can adequate cut a skin graft to any thickness that he desires. The majority can easily use mechanical type of skin grafting instruments, namely the Dermatomes, rather than carry out difficult free hand cutting. There are many men in the country that can cut uniform free hand grafts with the knife, but I admit that I am certainly not one of them. The skin grafting procedure is most valuable when we think of coverage of such things as large traumatic defects, whether they be complete avulsion, burns, or any other type of epidermis removal. In the procedure of radical mastectomy when one must go extremely wide, the area can be very easily closed over utilizing a skin graft and allowing the patient to have a very satisfying result rather than all the trouble that follows with skin sutured under severe tension. Of course, in the treatment of burns, the use of the skin grafting is invaluable. A word should be mentioned to the fact that skin grafting should be done as early as possible, and not delayed beyond three to four weeks at the most.

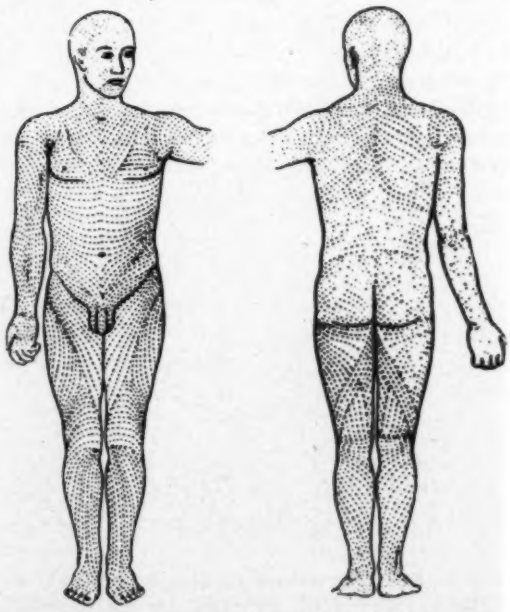

Fig. 7—Langer's lines—taken from Barsky "Plastic Surgery."

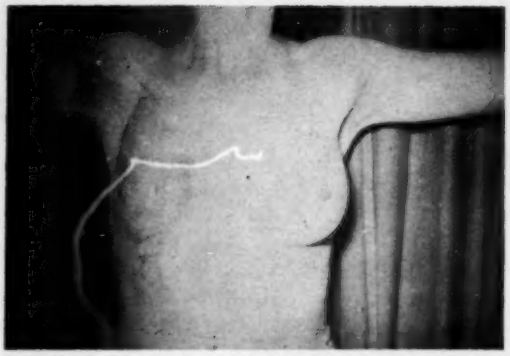

Fig. 8—Illustrating use of skin graft following wide radical mastectomy.

Fig. 9—Chronic leukemic ulcer of 4 years duration. Extremely painful.

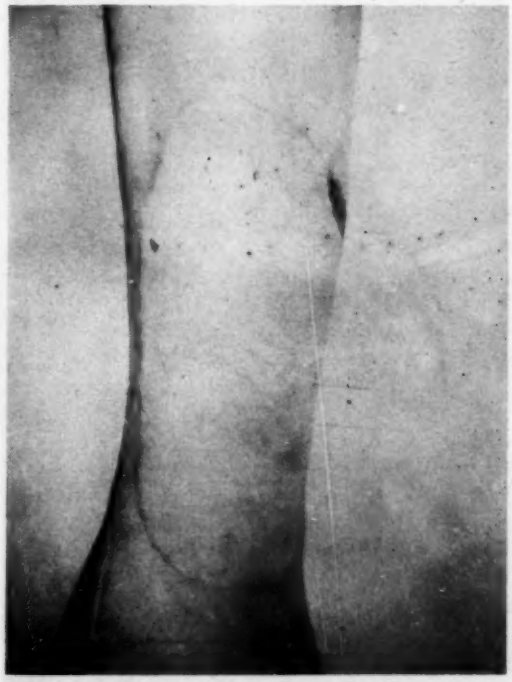

Fig. 10—Ulcer grafted. Free of pain.

Still another use for our skin grafting procedure is the full or split thickness graft termed by many the "cutis graft", and used for severe recurrent type hernia. This graft is placed within the wound, obliterating all dead space and is sutured under definite tension. I have used this on several cases of hernial repair, when the patient had multiple episodes of recurrence, with very gratifying results.

Fig. 11—Use of full thickness skin as buried graft in right inguinal herniorrhaphy.

Our postoperative treatment and follow up in grafting is of maximum importance because of the big and dangerous factor of infection. If we are grafting in an area where we are anticipating infection, such as about the buttocks or the perineum, it is my feeling that the wet technique of Kiskadden should be utilized. This technique embodies placement of the graft, coverage with two thickness of gauze and then laying of multiple catheters with heavy coverage over the entire dressing. The grafts are kept wet utilizing saline ordinarily, although if one anticipates or finds that the wound is contaminated with pyocyaneous infection then dilute acetic acid can be alternated. This technique has produced remarkable results in areas which are infected or which are very prone to become infected.

I am going to mention pinch grafting only to condemn it. The pinch graft is a valuable procedure only when a small area is to be covered. The reasoning is sound for the fact that the donor site will be very disfigured from pinch grafting and the recipient area will not be left with a smooth, flexible covering, but it will be irregular, thick and disfiguring. As long as we have other means of grafting, certainly I feel we should utilize the pinch graft only in very small defects.

Z Plasty

The use of the Z plasty or the shifting flap technique is a procedure that is very old in regard to its origin but which has only been stessed relative to its importance, within recent years. It is a procedure that is quite simple but which is invaluable when one wishes to obtain skin length wherein there is shortening due to vertical scar, or contraction about the axilla, or such contractions as one sees in children with congenital bands about the extremities. This procedure can be done singly or it can be done in sequence. One obtains increase skin length with little difficulty. This procedure can be utilized with less difficulty in many instances where the skin, as it exists, is close to the range of normal and wherein we have been accustomed to replacement by graft. One has a tendency to forget this valuable means of irradication of webbing and the elongation of skin area. I will illustrate some interesting stainless steel templets that are predetermined Z's utilizing the 60 degree angle and varying from ½ to 2 inches in length. These templets are certainly not original but are shown in the Journal of Plastic and Reconstructive Surgery. They make the use of the procedure quite simple even when one utilizes the small ½" Z at the corner of the eye and allows one to draw multiple Z's without worrying about the exact angles that are required.

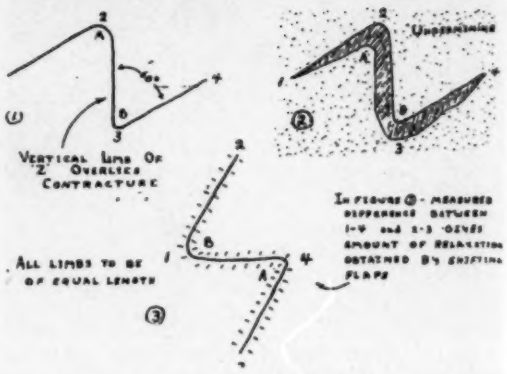

Fig. 12—Illustrates simple Z and reason why such procedure affords relaxation.

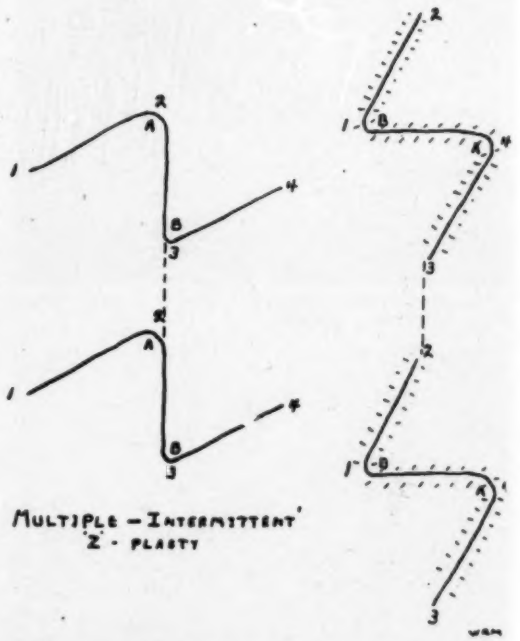

Fig. 13—Multiple intermittent Z plasty.

Flaps — Tubes

Flaps can be single or double pedicle, either open or closed by grafting of raw exposed surface, or completely closed as a tube. These flaps and tubes can be transferred at one or multiple stages depending upon the quality and degree of supporting blood supply. The use of these procedures demands careful study of position, blood supply, transfer time, immobilization, skin character, etc. They are invaluable to cover the dorsum of a traumatized hand, exposed bone; add coverage and padding for partial amputation of a finger, cover large surgical defects of the face wherein lining (as in the mouth) is required. Again it is better to err on the side of conservatism and utilize multiple stage transfer than lose the entire tube or flap. For skin coverage where subcutaneous fat is needed this is the best and safest procedure.

Summary

I have tried to point out a few of the basic principles of plastic surgery all of which can and should be utilized by the general surgeon. These principles are ones which all of us know but have a tendency to forget. If we will be painstaking enough to apply such principles, I am quite sure that the end results will in themselves gratify anyone for the time spent in application.

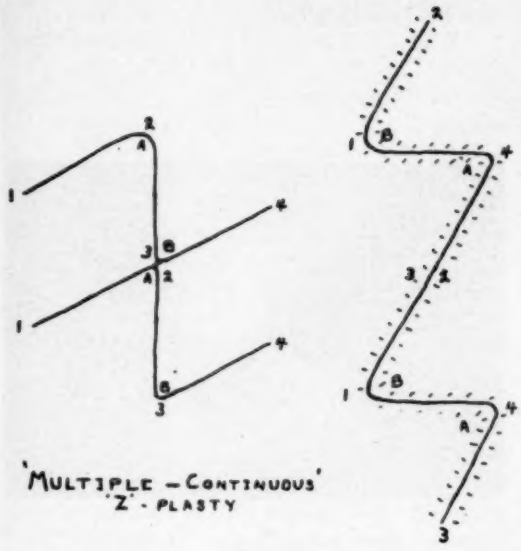

Fig. 14—Multiple continuous Z plasty. Can use any number of Z's.

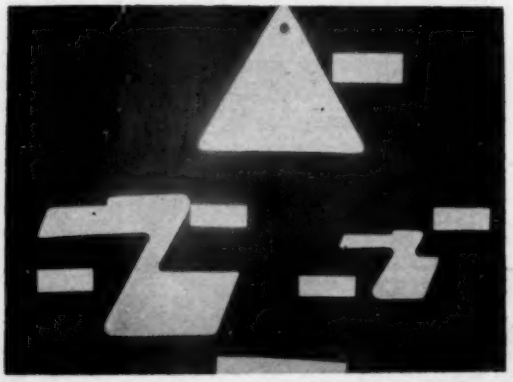

Fig. 15—Z templates made locally following article by Browne in Plastic and Reconstructive Surgery.

Remember basic principles:

1. The general surgeon can and should carry out plastic surgery techniques.

2. Preoperative planning is essential.

3. Have complete understanding with patient as to defect, need for correction, percent chance for good results, etc.

4. Photographs are invaluable.

5. Proper preoperative preparation

Attention to cleansing, shaving, debridement, etc.

Anesthesia—local or if general an understanding with anesthetist.

6. Instruments

Must be fine.

One cannot work on a watch with a plumbers wrench.

7. Postoperative attention to wound and particularly to graft may assure successful outcome of case.

8. Be meticulous and DON'T be in a hurry.

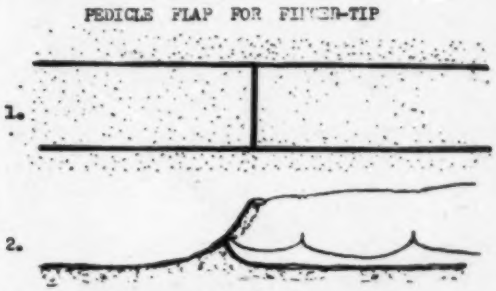

Fig. 16—Simple but valuable pedicle flap for partial amputation finger-tip.

Fig. 17—Defect following surgery and x-ray therapy for malignancy lip and mandible.

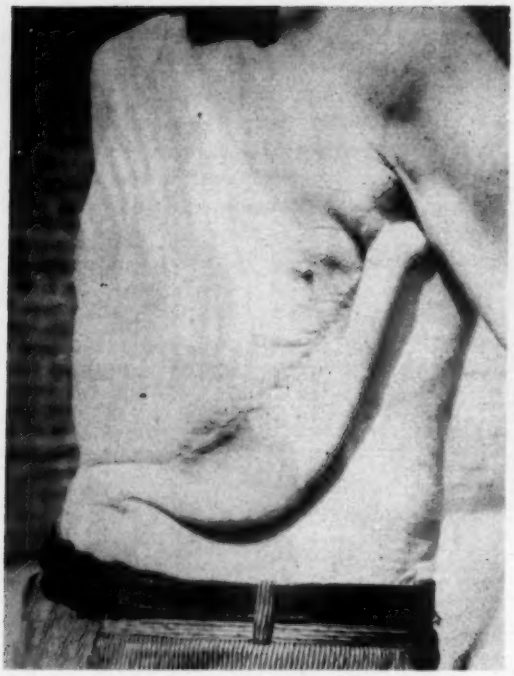

Fig. 18—Long thoraco—abdominal tube formed to cover defect face.

Fig. 19—Defect closed. Final procedure to reform corner mouth needed.

STRANGULATED INGUINAL HERNIA

Study of 93 Cases

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INTRODUCTION

Intestinal obstruction has long ranked high among surgical emergencies. Strangulated external hermias constitute from 40 to 50 per cent of all of the cases of acute intestinal obstruction. These include, mainly, inguinal, femoral, ventral and epigastric hernias. The first two types are by far the most common and fortunately attended with a slightly lower mortality than ventral and epigastric strangulations. Simple uncomplicated inguinal hernia is perhaps one of the most frequent, if not the most frequent, correctable annomalies of the human body and standard methods of repair are known to every doctor. Yet this condition, when coupled with strangulated hernial contents, carries considerable risk to the life of the patient.

DEFINITIONS

The terms strangulation and incarceration were clarified for proper selection of cases and defined as follows: "Strangulated hernia—an irreducible hernia with clinical and pathologic evidence of circulatory disturbance of its contents. Circulatory changes may or may not be reversable." "Incarceration—an irreductible hernia without any clinical or pathologic evidence of circulatory disturbance. Mechanical obstruction may or may not be present."

MATERIALS AND METHODS

With these criteria as guides, a total of 93 cases of strangulated inguinal hernia were studied. The statistical results and observations in this paper are based on the clinical, surgical and pathologic findings in these 93 cases.

The surgical specimens represented in this series were examined both macroscopically and microscopically. Particular attention was given to the length of bowel involved, the character of the distal and proximal portions and the mesentery of the bowel. An effort was made to corollate these findings with the clinical signs and symptoms as an aid to diagnosis and pathology present. Where applicable, comparisons have been made with similar studies found in the literature.

Read before the Arizona Medical Association Annual Meeting, Phoenix, Arizona, May 1-3, 1950.

HISTORY

Strangulated hernia has a history dating back to 3000 B.C. when an Egyptian priest initiated the belief that it was due to fecal impactions. It was not until the 17th century that this theory was disproved. The names of men famous in ancient medical science, as Roger of Salerano, Vesalius, Fallopius, Scarpa and many others all were prominent leaders. It may be said that the progress of treatment of this condition in general paralleled understanding of the anatomy, pathologica, and physiology involved.

PATHOLOGIC PHYSIOLOGY

It has been shown that inguinal herniations most commonly pass through one or more of three elastic openings in the anterior abdominal wall. The hernial contents are contained in a peritoneal sac and consists in the main of small intestine or omental fat. The elasticity of these anatomical structures render strangulation of the contents relatively less frequent than when rigid structures are encountered, as for instance with the femoral hernia. An increase in the intraabdominal pressure forces the hernia content through these elastic rings. If intestine is contained, gas and fluid bowel content are included. Continued peristalsis continues to fill the loop with gas or fluid material. Should the pressure persist for a short time, the elastic ring may compress the venous component of the mesenteric circulation, initiating circulatory embarrassment of the hernia contents. Continued arterial pulsation adds to the venous stasis and soon all the blood vessels and capillaries are "stuffed" with red blood cells. The picture of venous congestion, edema and swelling of the bowel wall rapidly follows until the pressure at the site of the constriction equals the arterial pressure and closes the lumen of the contained bowel, in effect, forming a closed loop obstruction with the mesenteric vessels occluded.

Transudation of fluid into the bowel wall, lumen and hernial sac soon ensues. The degree of fluid is largely determined by the length of bowel segment involved and whether the venous obstruction predominates. This latter showed

the greatest blood loss in experiments conducted by Wangensteen. An average of 59 per cent blood loss occurred in this group as compared to 35 per cent when arteries, veins and bowel were ligated. There was no fluid loss with pure arterial ligation. Early the transudated fluid is clear but progresses to serosanguineous color. This blood plasma loss may be enough to produce the picture of surgical shock.

The strangulated contents become increasingly gangrenous as the pathologic process proceeds. With decreased bowel viability the wall permability increases. Passage of bacteria into the peritoneal cavity results. Positive cultures of streptococcus hemolyticus, bacillus coli, staphylococcus, bacillus aerogenes and numerous others may be obtained from the peritoneal fluid at this gangrenous stage. Bacteria may occasionally be demonstrated when the fluid is clear.

FREQUENCY

Strangulation occured in approximately 1 per cent of all inguinal hernias and constituted about 1.7 per cent of all surgical emergencies of the abdomen and pelvis. Together with other external hernias it accounted for 53 per cent of all the causes of acute intestinal obstruction.

AGE AND SEX INCIDENCE WITH THE SITE OF HERNIA

This disease is predominantly a problem of geriatrics, the greatest incidence occuring between the 5th to the 8th decades with the peak between 60 and 70 years of age. The average for the series was 51.2 years. 90.3 per cent of the cases were found in males, with the ratio of right to left side of 2.2 to 1.0. Those patients below 10 years, the incidence of males to females was 11 to 1 and the right to left side 10 to 2. The mortality rate of 93 cases was 14.0 per cent.

OTHER PREDISPOSING FACTORS

Other predisposing factors of questionable value were occupation and social status. A history of the direct inciting cause of the strangulation was apparent in only about 10 per cent and included lifting heavy objects and upper respiratory infections, mainly.

SITE OF STRANGULATION

In order of frequency, the neck of the sac, the external, and internal rings were found to be the mechanical agent responsible for the strangulation. The last named was attended with the highest mortality rate.

DURATION OF SIMPLE HERNIA AND TRUSS

It was deduced from the statistics that the length of time that the patient has a hernia bares no particular relationship to the incidence of strangulation. It may occur early as it did in 9 cases or later after a lapse of 30 to 40 years. 29 of the patients gave a history of wearing a truss for varying lengths of time. There was one death in this group and 7 resections of the strangulated contents, including one of small intestine. A constant pressure, such as a pad would exert could very easily produce a chronic inflammatory process with result of scarring of the underlying tissue, perhaps adding to the fibrosis or constriction of the neck of the hernia sac. This has been cited as an etiological agent in strangulation.

TAXIS

No cases of reduction "en bloc" occured in this group; however 28 per cent of the patients had attempted taxis of varying degrees of gentleness and skill. Other forms of cure were hot packs, cold packs, enemas, laxatives, anaesthetics and various combinations of these.

McLaurin, an Australian surgeon, summed up the subject of taxis effectively as early as 1920: "I have no hesitation in saying that is safer to do an early operation, even by candle light in a "bush-humpy" without a nurse and by local anaesthesia than to venture upon the perilous seas of taxis."

CLINICAL MANIFESTIONS

The diagnosis of strangulated inguinal hernia was no problem in this series, being correct in 96.8 per cent. The symptoms and signs were those of an acute abdomen with evidence of intestinal obstruction and the presence of a painful hernial mass. It was indicated that differentiating strangulated omentum from intestine, clinically could be made with a fair degree of accuracy by the significantly low percentage of occurance of absence of colicy abdominal pain, fecal vomiting, obstipation, rigidity, distention or visible peristalsis in the omental group. The degree of strangulation present in the intestinal group was impossible to tell with any certainty because of the overlap of clinical manifestation. The temperature, pulse and white count, urinalysis and blood chemistries were not of particular diagnostic aid except as to the general condition of the patient.

It may be said that all of these were elevated when definitely gangrenous hernia sac contents are present, usually the highest being found with gangrenous intestine. X-ray aid was sought only in a very small number of cases and was 100 per cent correct for intestinal obstruction.

DURATION OF SYMPTOMS

Although the duration of symptoms had a direct bearing on the general condition of the patient, it was indicated that the severity of the constricting mechanism was more fundamentally concerned with the mortality rates. Also the time element seemed to be of little importance when tissue *other* than bowel was involved.

PREPARATION OF PATIENT FOR SURGERY

Preparation of the patient for surgery should be concerned with the aggressive restoration of the water and electrolyte balance, the correction of the blood volume and the elevation of the blood pressure if there is clinical evidence of shock. Also if gangrenous or perforated bowel is suspicioned, chemotherapeutic or antibiotic agents instituted. A planned procedure for replacing body proteins should be formulated if there is evidence of malnutritian or that the plasma proteins are low. Intubation as a sole remedial agent in the treatment of strangulated obstruction is to be condemned but when used as an adjunct prior to or during surgery as a means of emptying the stomach contents, is a valuable aid.

CONTENTS OF SAC

78.5 per cent of the 93 cases had small intestine strangulated in the hernial sac. The large intestine was involved in only 2 cases, neither of which resulted fatally. Of special interest was one case in which the hernial sac contained bloody fluid but the contents slipped back into the abdomen before visualized by the surgeon and no attempt was made to search for the involved tissue. Fortunately this patient lived.

TYPES OF HERNIA

Types of hernias found were not remarkable, 84 per cent being indirect inguinal. Direct inguinal, sliding and Richter's type made up the remainder.

BOWEL VIABILITY

Corollation of the character of the abdominal fluid, the appearance of the bowel and the mesentery with bowel viability was indecisive. No criteria could be determined with which to judge questionable areas. Generally it was found that the presence of free bloody fluid indicated bowel damage; however if not present, it did not exclude strangulation. The dynamics of bowel color and motility were infinitely more important in the questionable cases than the static qualities, that is, a visual improvement in the circulation indicated patency of the blood vessels. These were inhanced by inhalations of 100 per cent oxygen and warming with moist saline compresses. Pulsation of the mesenteric vessels was noteworthy and necessary to determine biability. Edema of the mesentery seemed to make little difference. Specific tests for viability were not used on any of the 93 cases other than the 100 per cent oxygen. The fluoressein and procaine hydrochloride tests are worthy of consideration.

OPERATIVE PROCEDURES

The group in which bowel was involved but reduced as being viable had a mortality rate of 0.6 per cent as compared to 53.8 per cent mortality where it was judged gangrenous and a definitive procedure instituted. The results of the latter were very striking. All those in which some temporizing procedure was done (enterostomy, exteriorization or iliostomy) terminated fatally. All those, in which a resection was done lived. There was no fatality in the two cases requiring a folding suture (Sumner type) repair of a portion of the bowel wall.

There were no cases in this series to demonstrate the efficacy of removal of the gangrenous bowel enclosed within an unopened hernial sac nor of an aseptic bowel anastomosis. The recent literature indicates these procedures, together with primary resection of strangulated intestine, would perhaps aid in lowering mortality in strangulated inguinal hernias.

The types of hernial repair following relief of the strangulation obstruction varied considerably. The Andrews-Bassini being the most popular. No repair was done in 7 of the 93 cases because of the general condition of the patient.

COMPLICATIONS

Most common complications resulting fatally were peritonitis, toxemia and shock. There were only two fatalities from pneumonia.

PATHOLOGY

Pathologic observations were made from the macroscopic and microscopic study of the surgically removed specimens. All tissues examined showed gross and microscopic evidence of blood congestion, edema and hemorrhagic infarction. Disintegration was apparent in the advanced examples of gangrene.

CONCLUSIONS

In conclusion it might be stated that:

(1) Strangulation of an inguinal hernia comprises a considerable group of surgical emergencies in which the mortality rate has remained persistently high.

(2) The mortality rate in uncomplicated inguinal hernias is exceedingly low.

(3) The constricting agent in strangulation has been shown to be a fibrous ring in the neck of the sac, the external and internal ring. That more strangulations do not occur in this type hernia is due to the absence of any rigid structures.

(4) Strangulated inguinal hernia is seen predominately in males between the sixth and seventh decades and usually on the right side.

(5) Duration of the hernia does not affect the mortality rate.

(6) Previous herniotomy of wearing of a truss does not affect mortality.

(7) Associated medical conditions had no bearing on the strangulations, but affected the mortality indirectly through the general condition of the patient.

(8) Taxis for strangulated or incarcerated inguinal hernia is to be condemned because of the possibility of reduction en bloc or reduction of non-viable bowel.

(9) The correct diagnosis of strangulated inguinal hernia was made in 96.8 per cent of the cases.

(10) The clinical differentiation between strangulated intestine and omentum in the hernia sac of a strangulated hernia may be made with a fair degree of accuracy.

(11) The degree of strangulation of bowel present is impossible to determine clinically with any degree of certainty.

(12) The duration of symptoms are of secondary importance; the severity of the constricting mechanism is a fundamental factor in determining the prognosis of bowel viability.

(13) Aggressive replacement of water and electrolyte losses, correction of blood volume and the blood pressure with whole blood and plasma, and instituting chemotherapy is strongly indicated in the preparation of the patient for surgery.

(14) Strangulated contents exclusive of intestine do not affect the mortality rate in strangulated inguinal hernia.

(15) Determination of bowel viability is very difficult in questionable cases of strangulated inguinal hernia.

(16) The mortality rate is high when the strangulated intestine is definitely gangrenous.

(17) Enterostomy, exteriorization or combination of those is considered an unsafe surgical procedure attended with a very high mortality rate when used on patients with gangrenous bowel.

(18) Primary resection of the involved bowel is the surgical procedure of choice—with amputation of the gangrenous loop.

(19) The removal of gangrenous bowel within an unopened hernia sac should be considered in strangulated inguinal hernia.

(20) Aseptic, oblique, end-to-end anastromosis should be considered as a procedure in lessening peritoneal contamination and overcoming the difficulties of anastomosing distended to collapsed bowel.

(21) The early use of massive doses of penicillin or penicillin with streptomycin, the aggressive replacement of electrolytes, the control of shock and loss of proteins by whole blood or plasma and the resection of gangrenous bowel are considered the main factors in lowering the mortality rate in strangulated inguinal hernia.

PULMONARY DENERVATION FOR INTRACTABLE BRONCHIAL ASTHMA*

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INTRODUCTION

This subject is presented as a preliminary, objective and factual report of sixteen operations on twelve patients for the relief of intracrable bronchial asthma. Insufficient time has elapsed to warrant either an appraisal or a condemnation of the procedure. Only those patients with intrinsic, intractable bronchial asthma of long duration with no relief from medication were considered as possible candidates. Bronchoscopy and bilateral bronchography were deemed necessary in ruling out other causes of bronchial wheeze. It was recognized that there are two broad clinical types of asthma. The first type includes those cases with a definite allergenic sensitivity with mucosal edema, congestion and increased secretion. They are usually seasonal and relieved by the antihistaminic drugs or desensitization. The second type comprises those patients with no distinct allergy but with recurrent infection in some portion of the respiratory tract. Here the bronchospasm involves reflexes originating in the bronchi. Denervation operations were done only on patients of the second type.

Most of the patients were given prolonged deep ether anesthesia and bronchoscopy for temporary relief from the intractable status. If such relief was not obtained, operation was deemed inadvisable.

PHYSIOLOGY

The physiologic basis for surgical treatment of intractable asthma is based upon the following facts:

(1) The bronchiole, with an absence of cartilage and a relative increase of smooth muscle, is the principal site of spasm.

(2) The vagus is the afferent pathway to the posterior pulmonary plexus.

(3) The sympathetic chain is the efferent pathway from the posterior pulmonary plexus.

(4) Stimulation of the distal end of the cut vagus causes bronchoconstriction. After nerve degeneration or atropinization bronchoconstriction is absent.

(5) Stimulation of the peripheral end of the cut sympathetic causes bronchodilation.

(6) Vagal and sympathetic fibers have homolateral and contralateral innervation.

(7) The posterior pulmonary plexus, the principal source of innervation of the lung, receives nerve fibers via the bronchus, the sheath of the pulmonary artery, and probably other root structures.

HISTORICAL

Kummel of Germany, in 1923, first did a cervical sympathectomy for the relief of intractable asthma and reported several cases of apparent cure. In 1924, Kappis reported 100 cases of right vagotomy with varying degrees of success. In 1926, Kummel reported his experience with section of the posterior pulmonary plexus. Also in 1926, Leriche of France recounted his experience with ramisection of the first four thoracic rami communicantes. In 1938, Reinhoff reported eleven cases of bilateral resection of vagal branches to the posterior pulmonary plexus. In 1942, Reinhoff and Gay reported twenty-one cases in whom a similar procedure was used; of these, seven were successful, although nine cases died within the first seven days following operation. In 1948, Dr. Brian Blades, in a personal communication in which he described the operative technique for the more thorough interruption of the pulmonary innervation, wrote: "Some dramatic results—some failures. Another year before we can be certain about final results."

SURGICAL TECHNIQUE

The surgical technique followed here is as follows: Right lung denervation is done first. A postero-lateral segment of the sixth rib is resected and the thoracic cage entered. The azygos vein is doubly ligated, transfixed and transected. The vagus nerve is exposed and all rami going to the bronchus and the posterion plumonary plexus are doubly ligated and transected (below the recurrent laryngeal). The plexus around the main bronchus isdestroyed and the sheath of the pulmonary artery is destroyed. At closure two water seal tubes are used and rapid expansion of the lung obtained. Left denervation is done several months later, if needed.

*Actually the word "denervation" is not a satisfactory term. It is used here in the absence of a more truly descriptive terminology and for the sake of brevity.

**Read before the 1949 meeting, Arizona Trudeau Society

Case No.	Sex	Age	Dur. of Asthma	Resid. in Ariz.	Date of first Observ.	Vit. Cap. before Aer. Inap.	Vit. Cap. after Aer. Inap.	Deep ether Anesth. and Bronc.	R. Pul. Denerv.	L. Pul. Denerv.	Present Status (May 1950)	Comment
1.	Fe	63	17 yrs.	2 yrs.	10/2/47	50%	70%	7/27/49 relief 1 mo. 11/17/49	11/30/48		no asthma	
2.	Fe	60	20 yrs.	1 yr.	1/15/49	46%	66%	2/17/49	2/23/49		Mild wheeze 2 mm adren. relieves	
3.	M	40	9 yrs.	1 yr.	1/26/49	40%	76%	1/29 4/28 7/1 - 10/4	3/1/49	10/17/49	no asthma	
4.	M	50	18 yrs.	1 yr.	2/15/49	22%	63%		3/19/49		4/28/49 mild asthma	overdose of Demerol. Expired
5.	Fe	26	5 yrs.	1 yr.	2/5/49	36%	73%	3/15/49 9/11/49	5/26/49		Some degree of asthma	
6.	Fe	43	21 yrs.	5 yrs.	5/26/49	48%	91%	5/31/49	6/1/49		Dysphagia Some degree asthma	
7.	M	48	7 yrs.	3 yrs.	4/8/49	30%	72%	4/20/49 6/9/49	6/17/49	8/2/49	no asthma	
8.	Fe	25	7 yrs.	4 yrs.	2/9/49	59%	93%		4/19/49		Slight wheeze	Will do left denerv. late
9.	Fe	40	5 yrs.	2 yrs.	8/13/48	30%	70%	2/25/49	3/24/49	2/10/50	no asthma	
10.	M	43	43 yrs.	5 yrs.	6/15/49	66%	80%		7/12/49		no asthma	
11.	M	40	14 yrs.	2 mo.	4/6/49	32%	80%	5/29/49	6/30/49	9/29/49	no asthma	
12.	M	48	10 yrs.	1 yr.	7/1/49	50%	70%	7/5/49 9/29/49	10/11/49		no asthma	

TABLE I

CASE REPORTS

Table 1, lists data pertinent to each of twelve cases. Duration of residence in Arizona is given to illustrate the failure of benefit from climate. Vital capacity, expressed in percentage of normal, is recorded before and after use of an aerosol antihistaminic to indicate the degree of respiratroy impairment due to bronchospasm. The dates of deep ether anesthesia and bronchoscopy reveal the periods of relative relief obtained.

COMMENT

Observation of the postoperative experiences of these cases indicates that the degree of relief depends to a great extention on the amount of pulmonary emphysema and impairment of "toilet" of the bronchial tree existing previous to operation. Further study of these factors may help in the more intelligent selection of cases. At present case studies include the use of the Collins respirometer and blood oxygen determinations with the oxyhemograph. This experience also shows the need for careful evaluation of the psychogenic facter in each case.

**Left denervation was done on February 20th. So far this patient is free of asthma.

SUMMARY

Experience with so-called pulmonary denervation in twelve cases of intractable bronchial asthuma has been presented. The postoperative period is too brief to permit any conclusions. Four of the cases have had bilateral denernation. One case is to have a left denervation in the near future.** Seven patients are free of asthma so far. One patient died from an overdose of Demerol taken in a period of despondency of mild asthma. One patient has persistent mild wheezing, relieved by two minims of adrenalin. One patient had postoperative dysphagia and continues to have asthma.

This series of cases would seem to indicate that further study of the surgical relief of intractable bronchial asthma is warranted.

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FULL TERM ABDOMINAL PREGNANCY WITH INTESTINAL OBSTRUCTION

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Abdominal pregnancies have been reported with increasing frequency since Cornell and Lash[3], in 1933, published a statisical review of 236 cases. Gardner and Middlebrook[5] added 22 and Beacham and Beacham[1] added 20 more.

The following case is presented because of the complications of intestinal obstruction and the delivery of a normal viable infant. Longley[6] reports that the fetal mortality is 67.3 in those that progress to term or in his review of 236 cases only 41 normal live babies were obtained.

Beacham and Beacham[1], in a report of twenty abdominal pregnancies from Charity Hospital at New Orleans, found that only 3 or 15 per cent delivered living infants.

Sutter and Wichser[8], reviewed forty-one additional cases from the literature and found a specific statement as to the development of the baby in thirty-one. "Twelve or 38.7 per cent, of these babies were found to be deformed. Ten, or 24.3 per cent of the babies died before the eighth day and his conclusions are that one-fourth of all extra-uterine pregnancies diagnosed after the fifth month of gestation will result in viable babies. About one-third of all these living babies delivered from extra-uterine pregnancies will have major or minor deformities, including those which are incompatible with life. Approximately half of all living babies delivered from extra-uterine pregnancies will survive eight or more days".

Bland[2] reported a maternal mortality rate of 34.7 per cent for 240 cases of late extra-uterine pregnancy collected from the literature from 1813 to 1907.

Cornell and Lash[3] reported a maternal mortality of 14.3 per cent in 236 cases and Ware[9] reported a maternal mortality of 30.76 per cent in thirteen cases operated upon during the past fifteen years. The chief cause of death was hemorrage and shock.

The diagnosis is difficult and was not made in this case prior to laparotomy. In the review reported by Gardner and Middlebrook[5] of 258 cases, the diagnosis was made in 83 prior to operation; in 27 cases the diagnosis was normal pregnancy; in 16 cases, pregnancy and fibroid tumor; in 15 cases, pregnancy and ovarian cyst. In the diagnosis of abdominal pregnancy the history in early pregnancy of tubal rupture is important. Roentgenograms may show a distorted fetus. Vaginal examination may show the cervix to be high and in an abnormal position to the presenting part. Lipiodol visualization of the uterus may be used to confirm the diagnosis.

The treatment of the placenta must be determined by the individual case. In the one reported the placenta was removed and this should be done if possible without endangering the life of the mother. In the cases reviewed by Gardner and Middlebrook[5] the placenta was entirely removed in 162 cases, with 17 maternal deaths; partially removed in 11 cases with 2 maternal deaths; and left in situ in 48 cases with 10 maternal deaths. Adequate blood transfusions, absorbable hemostatic cellulose gauze, and improved anesthesia are a distinct aid in facilitating its removal. Several cases have been reported where it was necessary to remove the encapsulated placenta several months after the initial operation[4-7]. Marsupialization is generally condemned.

REPORT OF CASE

Hrs. L. H., aged forty-four was first seen for prenatal care in January, 1948. Examination at that time revealed an enlarged uterus, approximately the size of a two months gestation. No adnexal masses or tenderness were noted. The patient stated that her past history was essentially uneventful, with the exception of having had two pregnancies, the last nineteen years ago. These pregnancies were without complications. Her last menstrual period was on November 16, 1947. On December 31, 1947 the patient complained of acute lower abdominal pain with associated nausea and vomiting. She was seen by a physician and was treated for a threatened abortion. The pain subsided after a few days. On February 19, 1948 the patient again had severe lower abdominal pain, with associated nausea and abdominal distention. She was hospitalized and observed for a period of three days. Examination by the admitting physician this time revealed the uterus to be enlarged and softened. No bleeding was present. The abdomen was markedly distended and no adnexal masses were felt. The blood count

Read before the Saint Mary's Hospital Staff meeting in 1950.

showed evidence of moderate secondary anemia (3,600,000) and the usual leukocytosis of pregnancy (12,550). Her temperature at this time was elevated for two days to 100 degrees. After her discharge from the hospital her prenatal course was uneventual until the last trimester. Her only complaint was that of constipation.

On September 1, 1948, or nine days after her expected date of confinement the patient was hospitalized for hypertension and albuminuria. Her blood pressure was 180/100 and urine examination showed a trace of albumin. The patient's only complaint was slight headache. Abdominal examination revealed a full term pregnancy. The vertex was presenting above the pelvic brim, the fetal heart rate was 140. On rectal examination the fetal head could be palpated high in the pelvis. No engagement was present. No abdominal contractions or tenderness were noted. Because of the position of the head and its failure to engage in the inlet of the pelvis, an roentgenogram of the abdomen was made. The report was as follows, "A mature fetus, near term, with the head obviously high and not engaged but what is a grossly normal appearing pelvis ample in all respects. It is apparent, however, that there must be some non-opaque obstruction of some type which does not allow the fetus to properly be engaged. In its present position the spine and occiput are to the right and the head lies to the right of the midline".

Approximately 36 hours after admission the patient suddenly developed severe continuous pain in the right side of her abdomen, more sèvere in the right flank and right upper quadrant. Abdominal examination showed no uterine contractions or rigidity; fetal heart sounds were normal; blood pressure was 140/90. The patient was observed for evidence of an acute abdomen. Twelve hours later the patient showed moderate abdominal distention, blood pressure was 140/90 and the pain was moderately severe in the same location. The picture was that of a low bowel obstruction, the distention became more pronounced, the patient failed to expell flatus and increased intestinal peristalsis was noted. A Barium enema was taken and the roentgenogram reported as follows; "Barium very slowly fills the rectum which distends before it can be forced through the sigmoid. It is seen that the sigmoid is moved toward the midline by the previously described non-opaque mass in the lower left quadrant. The sigmoid is primarily involved but is attenuated as it is stretched up over the mass. Barium is forced beyond this point of attenuation and narrowing in small amounts and it was deemed wise to go no further. It is obvious that the previously described non-opaque obstruction in the left flank is in the nature of a mass which is causing a partial obstruction due to its impingement upon the adjacent sigmoid which is moved toward

Figure 1

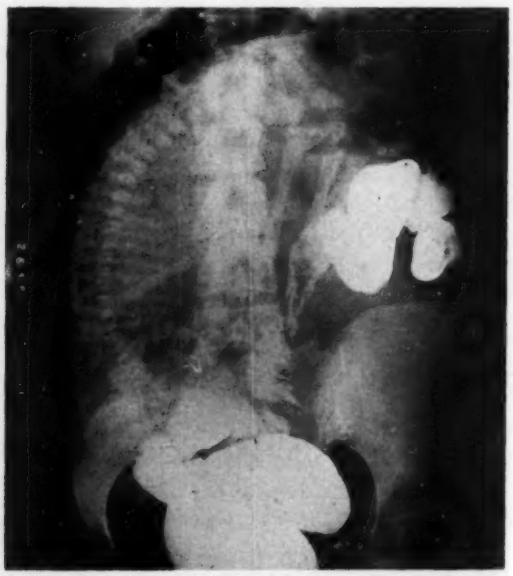

Figure 2

the midline. This same obstruction may well account for the fact that the fetus is held high and displaced to the right. The nature of the mass cannot be identified from these films".

In view of the physical findings and x-ray examination preparation for abdominal laporatomy was made. The preoperative diagnosis was intestinal obstruction due to lower abdominal tumor which also prevented engagement of the head. It was thought that this was a cyst or uterine fibroid. The abdomen was opened with a lower midline incision; a moderate amount of bloody serious fluid was first noted. A large apparently hemorrhagic cyst was present which was incised and the fetus delivered. The infant cried spontaneously. The origin of the sac in the left iliacfossa was adherent to the surrounding omentum and intestine. With the delivery of the fetus a large amount of bleeding started from the diffuse placenta, which was extremely friable, arising from the iliac fossa, extending into the region of the left broad ligament, and encrouched upon the sigmoid. Because of the profuse bleeding the fragments were removed as rapidly as possible and bleeding controlled by numerous pieces of cellulose gauze sutured over the bleeding surfaces. All bleeding was controlled in this manner. Examination of the uterous and adnexa showed no evidence of previous rupture or injury. The uterus was enlarged to the size of a three month's gestation. Blood was given continuously during the procedure and the patient showed no signs of undue shock. The abdomen was closed in layers. A rubber tissue drain was placed in the left iliac fossa and brought out through a stab wound. Post-operatively the patient was given anti-coagulants and penicillin. Her course was uneventual and the patient was discharged from the hospital on the tenth post-operative day. Examination after six weeks and again three month post-partum showed normal involution of the uterus with no residual adnexal masses or tenderness. Her menstrual periods resumed there regular cycle.

SUMMARY AND CONCLUSIONS:

A full term abdominal pregnancy with intestinal obstruction and the delivery of a normal viable infant is reported.

The placenta should be removed when possible to obviate a second operation to remove the ensapsulated placenta which is not always absorbed. The use of absorbable hemostatic cellulose gauze was found to be a valuable aid in controlling the hemorrhage and facilitating the complete removal of the placenta.

The intestinal obstruction produced by the abdominal pregnancy precipitated the operation that may have saved the patient's life.

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BASIC SCIENCE SEMINAR

PROTEIN FRACTIONS IN HUMAN BLOOD PLASMA

By

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Introduction

The word "protein" is of Greek derivation meaning "I take the first rank". Mulder gave the name of "protein" to what he considered the commencement, and starting point of all other tissues, because these are all produced from the blood.

Plasma is, of course, the end product of blood after the cellular elements have been centrifuged out. Plasma thus contains, three protein fractions, namely serum albumin, serum globu-

lin, and fibrinogen. Blood serum is blood plasma minus the fibrinogen fraction which has been removed in the process of clotting.

The studying of plasma protein chemistry is, in reality, only in its youth. The first amino acid, cystine, was first described by Wollaston in 1810. Liebig in 1842 wrote a paper to the effect that blood contained 2 ingredients, namely fibrin which is identical in all its properties to muscle fiber, and albumin, which is contained in the serum, and which has all the properties of egg white (5). Later globulins were discovered by Denis, a French physician, as methods of fractionation were devised. The greatest advances in blood protein chemistry have probably been made by Dr. E. J. Cohn, and his group, at Harvard, Boston, in the last ten years, proving that the chemistry of blood proteins is still in its infancy.

Classification and Origin

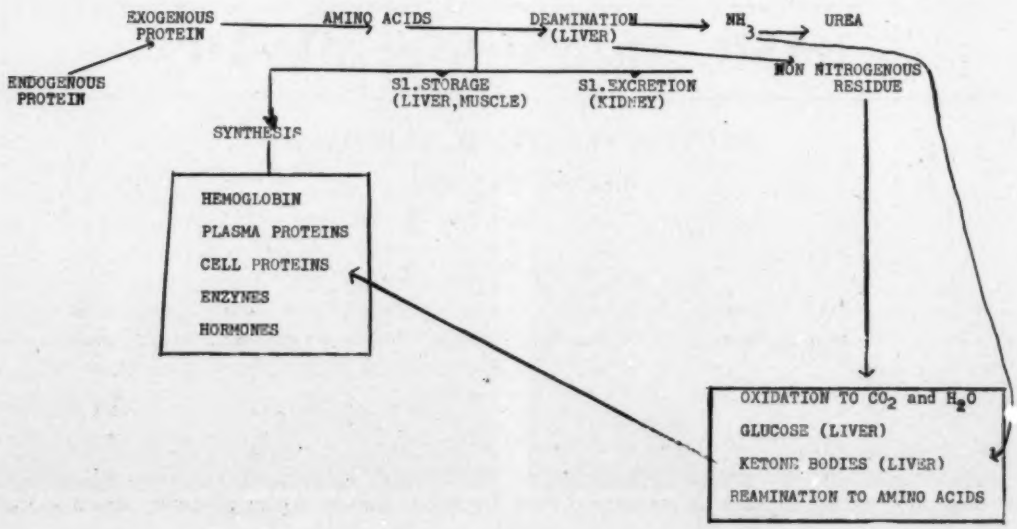
There are two different recognized classifications of proteins—the American, and the English. The differences between the classifications are only very slight, so that the American classification with its three large protein groups will be considered here (16).

1. Simple Proteins—
   - albumins—serum albumin
   - globulins—serum globulin, fibrinogen
   - prolamines
   - albuminoids
   - histones
   - protamines
2. Conjugated Proteins—
   - nucleoproteins
   - glycoproteins or glucoproteins
   - phosphoproteins
   - chromoproteins—hemoglobin
   - lecithoproteins
   - lipoproteins
3. Derived Proteins—
   1. Prim.—
      - coagulated proteins
      - proteans
      - metaproteans
   2. Sec.—
      - proteoses
      - peptones
      - peptides
      - dihetopiperazines

Thus the plasma proteins are classified as simple proteins, namely albumins, and globulins. The fibrinogen is also classified as a globulin.

The plasma proteins are synthesized in some way from amino acids (see diagram re protein metabolism). It is felt that fibrinogen (2) is produced in the liver, as proven by the reduction of this substance in liver damage or hepatectomy. There are six possible origins of the serum albumin, and globulin. They may be produced from disintegrating blood cells, the general tissue cells, the liver, the reticulo-endothelial cells of the spleen, or of the bone marrow, and perhaps from the intestinal mucosa. For years the liver was favored as the organ of production of these substances, but it is now

OUTLINE OF PROTEIN METABOLISM (4)



felt (13) that the globulins may at least be partially formed from the plasma cells, and the cells of the reticulo-endothelial system. There are no protein depots in the body as for carbohydrate and fat. Thus reserves are found (1) in the labile sytoplasmic protein, making up the plasma, hepatic, and muscular tissues of the body.

It has also been shown that the lymphocytes (12,40) in the lymphoid tissue are the storehouse for a portion of the globulin fraction of plasma—chiefly the gamma globulin, and possibly also the beta globulin. This globulin is mobilized and liberated into the blood stream by adrenal cortical hormone, and by A.C.T.H. through stimulation of the adrenal cortex. Administration of these hormones is followed by degeneration and atrophy of the lymphatic tissue, lymphopenia, apparently due to the dissolution of stored lymphocytes, and an increase in the plasma globulin. There is a simultaneous increase in the rate of release of antibody from lymphoid tissue (gamma globulin) indicating that serological defense reactions are partly under control of these pituitary and adrenal hormones.

Fractions and their Properties

Human blood is composed of 91% water, and 9% solids. The plasma proteins make up on the average 7:1 gms. per 100 cc of the total 9 gms/ per 100 cc solids.

Prot. in Human Plasma (2)	Rge	Av. (Gms./100 cc)
Total Plasma Protein	6.— 8	7.1
Fibrinogen	.20 — .40	.27
Serum Globulin	1.3 —3.2	2.7
Serum Albumin	3.6 —5.6	4.1

Ratio of 3 fractions 1:10:15
A/G Ratio 3.2 or 1:5

These figures are fairly constant for healthy humans. There is however, a discrepancy in the total plasma protein from birth to the age of four months. At birth, the total plasma protein level averages 5.9 gms. per 100 cc (36); at one month of age it is about 5.5 gms., and it only reaches the average adult level of 7.1 gms. at four months of age.

The plasma proteins were first fractionated into three substances—serum albumin, serum globulin, and fibrinogen. By more careful methods of fractionation, using a saling out procedure with either sodium sulfate, or alcohol, the serum globulin was subdivided into euglobulin, and pseudoglobulin I and II (4).

Later Tiselius (18) in Svedberg's laboratory, by using an ultra-centrifuge, and electrophoretic methods was able to separate the serum globulin into alpha, beta, and gamma fractions.

Recently Cohn of Boston (5) by methods of electrophoresis and sedimentation time, has been able to fractionate the plasma proteins into six large fractions. He has also proven that there are several different alpha and beta globulin factors in human plasma. His classification is as follows:

Fraction I—contains most of the fibrinogen (60-90%) and the antihemophilic globulin.

Fraction II—contains the gamma globulin anitbodies of proven value in the prophylaxis of measles, and probably also of infectious hepatitis.

Fraction III—1—contains other antibodies including those to typhoid 0, the isoagglutinins, including the anti-Rh antibodies.

Fraction III—2—contains prothrombin, and one of the components of complement.

Fraction III—3—contains plasminogen, the percurser of plasmin, the fibrinolytic enzyme.

Fraction III—0—is rich in Lipoprotein (beta 1 globulin)

Fraction IV—1—also contains lipoprotein (alpha 1 globulin)

These lipoproteins in Fraction III—0 and Fraction IV—I are bearers of cholesterol, carotene, and such steroids as estriol and vitamin A.

Fraction IV—4—contains a variety of enzymes, and hormones including hypertensinogen, thyrotropin, and a serum esterase.

Fraction V—contains human serum albumin.

Fraction VI—contains large amounts of salts especially citrates, and a small amount of protein.

Each of the three main proteins in plasma protein is a simple protein. Fibrinogen has a molecular weight of 200,000. It has been isolated in crystalline form, and X-ray diffraction studies indicate that its molecule is structurally similar to that of collagen. Its concentration is low, and thus it contributes little toward the total osmotic pressure of the blood.

Albumin has a molecular weight of 70,000—75,000. It is soluble in water, and dilate salt solution; it is also coaguable by heat. Since it makes up the highest concentration in plasma, the osmotic pressure, therefore depends largely on this fraction.

Globulin has a molecular weight of 150,000—190,000. It is insoluble in pure water, but soluble in dilute neutral solutions of salts of

strong bases and acids. Normally its concentration is less than that of albumin.

Functions of the Plasma Proteins (2)

1. Fibrinogen is essential for the clothing of blood.
   Prothrombin plus Thromboplastin plus Ca yields Thrombin
   Thrombin plus Fibrinogen yields Fibrin.
2. All three serve to maintain the osmotic pressure of the blood.
   It is to be noted that the pressure which each fraction exerts is inversely related to the size of the molecule, and directly related to its concentration in the plasma.
   Thus the albumin which has the highest concentration, and the least molecular weight, exerts the greatest osmotic activity.
3. The plasma proteins give a certain viscosity to the blood which is a factor in the maintenance of a normal blood pressure.
4. They aid in the acid base balance of the blood.
5. The globulin, and fibrinogen fractions tend to influence the stability of the blood by causing the corpuscles to adhere to one another, and form rouleaux or clumps.
6. They contain substances from which leucocytes prepare trephones which are essential for the nourishment of tissue cells grown in cultures.
7. They contain immune substances which are associated with the globulin fraction, and which are increased during the process of immunization.
8. They serve as a reserve of protein upon which the body draws during fasting, or when the protein intake is inadequate (28).

Clinical Diagnostic Value

The average value of the plasma proteins is between 6.0 to 8.0 gms. per 100 c.c's. The concentration of the serum albumin is much more than that of the serum globulin by a ratio of 3.2. The albumin is affected much more readily than the globulin by the protein intake, while the globulin is regenerated more quickly than the albumin following hemorrhage (4). As a generalization it can be stated that the albumin fraction is rarely increased above normal, and the globulin fraction rarely decreased below normal.

Moore and Van Slyke (27) state that patients will develop non cardiac edema when the total plasma protein falls below 5.5+.3% or when the albumin fraction falls below 2.5+.2%.

1. Low Total Plasma Proteins (Hypoproteinemia)

This may occur because of one or more of three causative factors:

A. Inadequate supply of protein.

B. Impaired synthesis of protein.

C. Excessive protein catabolism.

Inadequate supply of protein may cause such clinical conditions as war edema, famine edema, and nutritional edema. Here inanition is the causative factor. It is also a factor in the low total plasma protein seen in far advanced tuberculosis, and malignancy. It is seen too in gastrointestinal disorders accompanied by impaired protein digestion or absorption, prolonged vomiting or diarrhea, such as peptic ulcer, G.I. malignancy, pancreatic disease, intestinal fistula, short circuiting operations on the intestines, chronic ulcerative colitis, tuberculous and chronic enteritis, congestive heart failure with edema of the G. I. mucous membrane, and pellagra.

A low total plasma proteins due to impaired synthesis occurs in the following condition:

1. Chronic hepatic disease
2. Chronic glomerulonephritis
3. Various infections
4. Severe anemias (uncontrolled pernicious anemia).
5. Cachectic states
6. Pregnancy and lactation (25)

It is especially true in eclampsia and pre eclampsia.

A low total due to excessive protein catabolism may be found in uncontrolled diabetes mellitus, and severe thyrotoxicosis.

II. *Hyperproteinemia*

An increased total plasma protein occurs usually in dehydration. However, in many cases where dehydration is a factor, complication factors such as inanition, diarrhea, and vomiting, exert an influence which tends to decrease the plasma protein concentration. However, in the following cases, a total plasma protein of from 10.–12. gms. per 100 cc, have been reported.

1. Cholera–infant diarrhea
2. Shock
3. Burns
4. Diabetic acidosis
5. Addison's disease
6. Intestinal obstruction
7. Heat exhaustion.

III. *Hypoalbuminemia*

A decrease in the albumin fraction of the plasma proteins is usually associated with a compensatory increase in serum globulin, and

occasionally fibrinogen. A decrease in the serum albumin is found in the following conditions:

1. Nephritis
2. Nephrosis
3. Amyloid diseases of the kidney.
4. Congestive heart failure
5. Multiple myeloma
6. Chronic hepatic disease
7. Extensive burns.
8. Pick's disease (polyserositis)
9. Intestinal obstruction
10. Generalized peritonitis.

In chronic nephritis as much as 60 gms. of albumin may be eliminated per day. A daily loss of 4-5 gms. may result in a gradual decrease in the level of the plasma protein. Van Slyke found that cases of this condition which maintained plasma albumin values above 2.2 gm. per 100 cc or total protein values above 5.5 gm. per 100 cc have a better prognosis than those which do not. Thus the plasma protein concentration is of prognostic significance during the acute stage of glomerulonephritis. Also a low plasma protein concentration, usually below 2.5 gm. per 100 cc is the rule in diagnosing the chronic active stage of glomerulonephritis. As the chronic active stage progresses into the terminal stage, there is a marked tendency for the plasma proteins to increase, normal values being obtained in about half the cases during the terminal stage of the disease. This may be due in part to decreased albuminuria, and in part to hemoconcentration.

In chronic renal disease, the decrease in plasma protein is due to three factors—albuminuria, a nutritional defect which interferes with the ability of the organism to regenerate serum albumin, and malnutrition (a lack of adequate protein intake).

In nephrosis the globulin and fibrinogen are commonly markedly increased—the former rising to 5 gm per 100 cc and the latter going as high as 1 gm. per 100 cc.

The hypo-albuminemia seen in extensive burns, intestinal obstruction, and generalized peritonitis is due to the loss of plasma from the circulation (14).

IV. *Hyper-Globulinemia*

In general the alpha globulins increase in febrile conditions; the alpha and beta globulins increase, while the gamma globulins decrease in chronic nephrosis (6). The beta and gamma globulins increase in multiple myeloma, while the alpha and gamma globulins increase in tuberculosis. There is a close correlation between the sedimentation rate, and the alpha globulin concentration. Both increase in the presence of considerable tissue destruction or inflammation (31). Hyperglobulinemia with or without hyperproteinemia occurs in the following conditions:

1. Certain acute and chronic suppurative conditions.
2. Lymphopathia venereum.
3. Multiple myeloma
4. Boeck's sarcoid
5. Certain miscellaneous conditions.

There is evidence which suggests that the maintenance of a high plasma globulin concentration is responsible for the development of amyloid disease in conditions associated with chronic suppurative processes.

In multiple myeloma, the hyperglobulinemia is present in 50-60% of cases (3). The beta and gamma globulins increase, and there is also some suggestion of the presence of a Bence-Jones protein in the serum.

The miscellaneous conditions include malaria, leukemia, syphilis, rheumatoid arthritis, filariasis, tuberculosis, lupus erythematosis periarteritis nodosa, leprosy, and kala-azar.

V. *Hypo-albuminemia and Hypo-globulinemia*

This combination of a low serum albumin and a low serum globulin is the exception to the rule and is only seen in children with either coeliac disease, or far advanced malnutrition.

VI. *Fibrinogen Fraction*

The normal value of fibrinogen is from 200-400 mgms. per 100 cc. It is increased in the following conditions:

1. Slight hepatic injury (hepatitis)
2. Most acute infections (except typhoid fever)
3. Pregnancy and menstruation
4. Following X-ray radiation.
5. Focal infections—sinusitis, tonsillitis
6. Nephrosis
7. Multiple myeloma
8. Lymphopathia venereum.

In nephrosis the fibrinogen may be up to 1000 mgms. per 100 cc in order to compensate for the decrease in serum albumin. The increase here, as in the case of acute infections, is made possible by the existance of a generalized increased cellular permeability, allowing the more ready entrance of the comparatively large fibrinogen molecule into the circulation.

Fibrinogen is decreased in the following conditions:

1. Hepatic insufficiency.
2. Typhoid fever.
3. Following severe hemorrhage–temporary.
4. Cachetic conditions.
5. Constitutional fibrinogenopenia.

In this latter condition there may be a delayed coagulation of blood, or profuse bleeding after slight trauma due to an inadequate amount of fibrinogen (30). The fibrinogen is also occasionally decreased in pernicious anemia, pellagra, scurvey, myelogenous leukemia, and other diseases of the bone marrow (41).

Use in Diagnostic Reactions

Many liver function tests depend on reactions (usually chemical) involving either the serum globulin or the A/G ratio.

The Takata-Ara Reaction (23) is positive due to an increase or qualitative abnormality in the globulin fraction. It is positive in portal cirrhosis, and other forms of severe hepato cellular damage.

The Formol-Gel Reaction (2) is positive in conditions accompanied by a significant hyperglobulinemia. Thus a positive reaction is obtained in the same conditions as the Tahata-Ara Reaction is positive.

A paretic type of colloidal Gold Curve (21) is produced by some qualitative or quantitative change in the euglobulin or gamma globulin fraction. This curve is seen in portal cirrhosis, portal necrosis, hepatitis, and portal malignancy.

The Cephalin-Cholesterol Flocculation Test (14) depends on one of three factors for its positiveity:

1. An increase in the gamma globulin in such quantity that the normal components of the serum albumin fraction are unable to inhibit the reaction.
2. A decrease in the serum albumin concentration below that capable of inhibiting the reaction.
3. A decrease in the flocculation-inhibiting properties of the serum albumin fraction due to its chemical modification.

Thus the Cephalin-Cholesterol Flocculation Test is positive in a large proportion of cases of active hepato-cellular disease.

The Thymol Turbidity Test (22) gives results parallel to those obtained with the Cephalin-Cholesterol Flocculation Test. The only difference is that it gives a positive response in lipemia sera. Thus it is positive not only in many cases of active hepatocellular disease, but also in diabetes mellitus, and nephrosis.

Weiss (38) has devised an excellent method in determining the amount of liver damage in cases of liver disease. This determination is based on different shifts of the A/G ratio. The test itself is based on three separate determinations of the blood protein-albumin, globulin, and fibrinogen, and three complete blood counts.

The procedure in the test is as follows:

1. Bed rest with no food.
2. 6 cc. oxalated blood is drawn for determination of plasma proteins, and C.B.C.
3. A mixture composed approximately of ½ liver, ¼ stomach mucosa, ⅛ pancreas, and ⅛ spleen. After a skin test is performed, 1 cc of the above mixture is injected deeply into the gluteal muscle.
4. The injection of 1 cc of mixture brings about a rapid shift of the blood proteins and corpuscles in one to two hours. The lower the A/G ratio, with globulin being the denominator, the more affected is the liver function. A shift in the blood count is advantageously used for prognosis, a decrease in lymphocytes being a favorable sign, and an increase in the number of lymphocytes indicating a poor prognosis.
5. 6 cc of blood withdrawn one hour after injection.
6. 6 cc of blood withdrawn two hours after injection.

The results depend on one of five different shifts of the A/G ratio, and may be interpreted as follows:

(a) When the A/G ratio changes only within its physiological range, i.e. less than 0.1 of its value, liver function is normal.

(b) When the A/G ratio increases after one hour, and again after two hours, liver function is slightly affected.

(c) When the ratio increases after one hour, and decreases after two hours, liver function is moderately affected.

(d) When the ratio decreases after one hour, and increases after two hours, liver function is markedly affected.

(e) When the ratio decreases after one hour, and again after two hours, liver function is seriously affected.

Therapeutic Uses of the Serum Albumin

Normal human serum albumin was primarily

(20) developed as a blood substitute for use in traumatic shock. It is to be noted that concentrated albumin, unlike concentrated plasma or gelatin is only as viscous as whole blood with a hematocrit reading of 50% (7), and when injected, it lowers blood viscosity due to hemodilution. That is why it is more readily tolerated by patients with mild congestive failure than whole blood, or other more viscous colloidal solutions. It may be used in the following conditions:

1. In the treatment of shock.
2. In the treatment of hypoproteinemia with edema
   (a) Chronic nephritis.
   (b) Chronic nephrosis.
   (c) Chronic cirrhosis.
3. In the treatment of acute nephritis.
4. In the treatment of toxemias of pregnancy.

In the treatment of shock, albumin appears as to be an effective blood substitute. Studies in circulatory dynamics in shock patients receiving albumin showed that improvement after albumin therapy was associated with an increase in cardiac output which was greater than that produced by the administration of whole blood (8).

The serum albumin is distributed in 25% solution, and in the treatment of burns, hemorrhage, or trauma in patients with decreased blood volume, it produces both clinical improvement, and a considerably greater increase in the plasma volume than can be accounted for by the volume of the solution injected. Saline enhances the effect of the albumin. A 5% albumin solution in 0.85% saline solution is approximately isosmotic, and isotonic with citrated human plasma. Thus each 100 cc of 25% albumin solution should be supplemented with 400-500 cc N. saline solution when possible, in the treatment of shock. This may be given by vein, or by mouth.

Hypoproteinemia is associated with chronic Bright's disease (35) has been treated with some success with salt poor concentrated human serum albumin. The dosage used has been 50 gms per day over a period of twenty to thirty days. Since the serum albumin is salt free, it is given in 10% glucose solution. Following the first dose, there is an increased urine output associated with an increased excretion of protein, chloride, phosphorus, and non-protein nitrogen. There is a slight increase in the serum albumin level. This treatment works best on massive edema cases, and produces no response in non-edema, or minimal edema cases. Its value is that it affords transient symptomatic treatment.

Serum albumin may be used in acute nephritis, and acute sulfadiazine intoxication producing acute renal failure, to maintain an adequate serum protein level without elevation of the N.P.N. provided sufficient calories are administered to spare protein catabolism. This is in line with the present feeling that the best treatment for anuria is to keep the chemical composition of the body fluids as normal as possible by parenteral and oral administration of carbohydrate, fluid electrolytes (29) under rigid laboratory control. Thus the patient is kept alive until spontaneous repair of the renal lesions leads to a return of the excretory function.

There is excreted a large amount of serum globulin, and serum in pre-eclamptic patients (11). It also appears that the serum protein level may be a better index of the severity of pre-eclampsia than the uric acid determination. In keeping with this statement is the fact that anuria is a sign of seriousness, and that unless diuresis can be effected, improvement usually fails to take place. Salt poor serum albumin in a dose of 25 gms every six hours is a potent therapeutic aid in the treatment of anuria by increasing the blood volume, and decreasing the viscosity—thus enhancing the filtrable activity of the glomeruli (34). This serum albumin should be used in conjunction with the standard treatment of pre-eclampsia. Dorr also feels that if a patient does not improve with that treatment within twelve to thirty-six hours, or if after improvement there is a return of symptoms or clinical findings, delivery should be consummated.

Therapeutic Use of the Globulin Fraction

Pooled gamma globulin (33) refers to the gamma globulin from large pools of adult blood plasma. By fractionating this pooled plasma by a method first developed by Dr. E. J. Cohn and his co-workers (7) at Harvard medical school, a gamma globulin fraction was obtained (15) which has a concentration in antibodies of about 25 times that of normal pooled plasma. Thus the uniformity of antibody levels in pooled plasma, and thus in gamma globulin depends chiefly upon the following factors:

1. The presence of endemic or recent epidemic disease in the geographical area from

which the blood is drawn.

2. The amount, and duration of antibodies resulting from specific infections.
3. The number of donors contributing to the pool.

A combination of Fraction I and thrombin has been used to promote adherence of skin grafts (9), and to form a coagulum (10) around calculi in the renal pelvis so as to effect their complete removal without fragmentation. In the form of fibrin foam with thrombin, the clotting proteins have been widely and successfully used to accomplish rapid hemostasis in neurosurgical, and certain other surgical procedures. The anti-A, and anti-B isoagglutinins and the Rh globulin derived from Fraction III-1 by concentration of this activity from pooled group-specific or anti Rh plasma (24) provide dependable reagents for grouping blood which should increase the safety of transfusions of either whole blood, or of resuspended red cells.

The gamma globulins have come into importance in recent years because of its value in attenuating and preventing certain diseases. Its value has been investigated in the following diseases:

1. Measles
2. Mumps
3. Scarlet fever
4. Infectious hepatitis
5. Poliomyelitis

It is felt in pediatric circles that children under five years of age should be either attenuated or protected against measles, and that children under two years of age should definitely be protected against the disease because of the severity of certain complications. In Great Britain and Canada, convalescent measle serum is used almost exclusively in the prevention or attenuation of measles, while in America gamma globulin is used. For attenuation 2.5 cc of convalescent measle serum, or 1.2–1-5 cc of gamma globulin is the usual dosage (19). For protection 5.0 cc of convalescent measle serum is required, or 3.5 cc of the gamma globulin is used. 91-92% of patients, using either therapeutic agent obtain attenuation.

In the protection line, 70% are protected using convalescent measle serum, while 82% are given protection by the gamma globulins. The dosage of gamma globulin recommended for protection is 0.1 cc per pound body weight given intramuscularly as soon as possible after the first exposure to the infection. However, large doses of gamma globulin administered in the prodromal stage of the disease, at or previous to the appearance of Koplik spots ,also apparently modify the disease (33).

The value of gamma globulin in mumps appears to depend upon facilities for the pooling and fractionation of large amounts of convalescent plasma (33). The injection of ordinary gamma globulin produces no significant effect. However, the injection of 20 cc of gamma globulin from convalescent pools produced a decrease of from 8-33% in the incidence of orchitis. Thus if the pooled gamma globulin is obtainable, it should be reserved for the treatment of adult males in the first twenty-four hours of the disease, with the aim of preventing or attenuating acute orchitis, thus decreasing the high incidence of sterility in the male following mumps and orchitis.

Gamma globulin has also been used in the treatment of scarlet fever (32). In mild cases of scarlet fever the use of gamma globulin, in doses of 1 cc per pound body weight us to a total of 60 cc, appears to attenuate the disease more than the use of antitoxin alone. However, in severe toxic cases of scarlet fever, scarlet fever antitoxin should be used.

Stokes (33) feels that gamma globulin is beneficial in the prevention of infectious hepatitis in doses of .06 cc per pound body weight, but that it was of no value in the treatment of the active disease. Injections of gamma globulin in the prodromal pre-icteric stage or in the acute stage, fails to attenuate the infection (37). It was found that gamma globulins confer temporary benefits on the long chronic type of infection in doses of 20 cc per day on alternate days.

The effects of gamma globulins in poliomyelitis has also been tested and Stokes (33) has come to the conclusion that gamma globulin injected during the incubation period, or in the preparalytic stage has no effect on the course or the outcome of the disease.

Therapeutic Use of Fibrinogen

In the studies of Cohn's fractions, it was shown that Fractions I, II, and III had marked antihemophilic activity. Since Fraction I contains from 60-90% fibrinogen, it is used as the best source of antihemophilic potency. Fraction I is available in vials of 200 mgms; it is in powder form, and is injected intravenously after being dissolved in 50 cc of sterile distilled water.

In fifteen to thirty minutes, 200 mgm will lower the venous coagulation time in hemophilia toward normal, and its effect will last about four hours (39). This treatment is better than blood transfusion in hemophiliacs, as it lowers the coagulation time much more. Thus it is of value in hemophiliacs in extracting teeth, in surgery, and in the stopping of hemorrhage from a wound.

Conclusion

In this review of plasma protein chemistry, an attempt has been made to summarize the advances made in this subject since its beginning in 1842 up to the present time. It is also designed to show that there is still much investigation to be performed before the complete story is unfolded.

Also, I would like to thank Dr. A. C. Van Ravenswaay and Dr. M. G. Vavich for their kind assistance in helping me prepare this paper.

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Certain general rules must be followed, however, and the Editor therefore respectfully submits the following suggestions to authors and contributors:

1. Follow the general rules of good English, especially with regard to construction, diction, spelling, and punctuation.

2. Be guided by the general rules of medical writing as followed by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. (See MEDICAL WRITING by Morris Fishbein.)

3. Be brief, even while being thorough and complete. Avoid unnecessary words. Try to limit the article to 1500 words.

4. Read and re-read the manuscript several times to correct it, especially for spelling and punctuation.

5. Submit manuscript typewritten and double-spaced.

6. Articles for publication should have been read before a controversial body, e.g., a hospital staff meeting, or a county medical society meeting.

The Editor is always ready, willing, and happy to help in any way possible.

Editorials

ELECTROLYTE BALANCE

Our knowledge of tissue fluid chemistry has taken a great stride forward with the employment of isotopes to trace the fate of less well known chemicals during their journey through the body. Many inexplicable untoward results of supposedly good therapy now become understandable. But since there is a considerable time lag between the discovery of a significant biochemical fact and its employment by the clini-

cian needless deaths still occur—preventable deaths.

A great advance in proper therapy was the then new avenue of fluid administration, namely hypodermoclysis and venoclysis. Subsequently there was added to the isotonic salt solution glucose, and still later other substances such as proteins, vitamins, blood, and antibiotics. The disappointing results obtained with these solutions in certain cases led to the discovery that saline solution is of itself toxic if used in excess, and that too much of it in the body led to dilution of the already depleted other rarer electrolytes, and the effort of the body to wash this excess out through the kidneys further depleted other ions that the ill body could scare afford to lose. It is to be recognized that saline simply replaces sodium and chlorides and glucose is simply a food for quick energy but is in no form an electrolyte. Yet too many of us still restrict the parenteral fluids to 5% Glucose in saline solution.

The dehydrated patient, and this refers equally to surgical as well as medical patients needs singly or in various combinations, red cells, plasma proteins, water, Sodium, Chlorides, Bicarbonates, Potassium, Phosphorus, Amino Acids, Dextrose, and Vitamins. The dehydrated patient is especially short on intercellular potassium which was lost with acidosis and loss of fluids. The rapid replacement of total tissue fluids with Saline solution simply dilutes the reduced potassium present. If, however, potassium is infused into the blood stream too rapidly as by intravenous use of it instead of sodium, untoward results again ensue. The intercellular potassium diffuses into the cells very slowly, and an excess of intercellular potassium, even tho the cells are depleted, will lead to cardiac damage. On the other hand, a loss of potassium without replacement will lead rapidly to death, as is seen in certain cases of diabetic acidosis and coma who die because of the lack of potassium. This is but a single example of the vital need for a clear understanding of the significance of proper electrolyte balance.

Lately there has been too great a tendency to give intravenous fluids. We all see on hospital wards patients perfectly able to retain oral fluids sitting upright in bed getting an intravenous feeding, with the fluid running in at a greatly excessive speed. This massive flooding of the circulation is both dangerous and wasteful, expensive and messy. A lucid patient who has no difficulty swallowing and is not vomiting may very well take his fluids orally with a lot less expense and trouble.

The key to correct judgment and proper use of our newer knowledge depends entirely on the laboratory reports of the status from day to day of the electrolyte values. It must therefore be an expensive but rewarding procedure—and utterly essential that daily or even hourly check be made on the progress of each case. The intelligent use of the laboratory reports will save lives. Clinical judgment is here emphatically not enough.

P. L. S.

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PHOENIX CLINICAL CLUB MASSACHUSETTS GENERAL HOSPITAL CASE NO. 29011

The Case History in this discussion is selected from the Case Records of the Massachusetts General Hospital, and reprinted from the New England Journal of Medicine. The discussant under Differential Diagnosis is a member of the staff of the Massachusetts General Hospital. The other discussants are members of the Phoenix Clinical Club.

A fifty-six-year-old author came to the hospital because of crampy abdominal pain, nausea and vomiting.

Beginning six months prior to admission he was often awakened because of crampy abdominal pain that was usually followed by nausea and at times by vomiting. During the day he usually felt better, but was bothered by "bloating" eructations and belching. An x-ray study done one month later demonstrated "colitis." One month before entry he developed constipation and often passed large amounts of gas by rectum. These symptoms were particularly noticeable since, following the resection of a fistula-in-ano fifteen years previously, he never had been completely continent of feces and movements tended to be loose. Five days before admission he became very constipated and suffered with extreme abdominal cramps, and subsequently his abdomen became distended. His physician treated him with repeated enemas, and some relief followed explosion of gas. Three days later he began to vomit a thin fluid, which did not contain blood or coffee grounds and did not have a fecal odor. He had never noted

tarry, bloody or alcoholic stools and had never been jaundiced. During the three months prior to admission he lost twenty pounds. For many weeks he was accustomed to drink as much as a pint of rye whiskey each day "to relieve nervousness and insomnia," but this was discontinued during the week prior to admission.

The family and past histories were noncontributory.

Physical examination revealed a very ill, dehydrated man who grunted with each breath. The mucous membranes were pale, dry and cracked. Examination of the heart and lungs was normal. Both diaphragms were elevated to the fourth rib anteriorly, and chest movements were limited. The abdomen was enormously distended and tympanitic throughout. The peristaltic sounds were weak and almost absent. No masses were felt on rectal examination, and sphincter control was absent.

The blood pressure was 122 systolic, 80 diastolic. The temperature was 99.1°F., the pulse 94, and the respirations 21.

Examination of the blood revealed a hemoglobin of 10.5 gm., red-count of 3,060,000 and a white-cell count of 16,700. The urine was cloudy, amber and acid in reaction, had a specific gravity of 1.010 and negative tests for diacetic acid, acetone and bile; one plus test for albumin; a rare red cell, 10 white cells and 4 epithelial cells per high power field; the sugar test was negative. The serum nonprotein nitrogen was 122 mg. per 100 c.c. the chloride 94.6 milliequiv. per liter, and the protein 4.9 gm. per 100 c.c. The stool was guaiac negative.

A flat plate of the abdomen demonstrated considerable gas in the dilated stomach and in numerous loops of small bowel, and probably a small amount of gas in the nondilated ascending and transverse colon. There was a large area of calcification overlying the fifth lumbar vertebra.

Many unsuccessful attempts were made to pass a Miller-Abbott tube into the small bowel. Accordingly, after glucose and saline infusions and plasma transfusions, under novocain infiltration, the abdomen was entered through a small oblique incision just to the left of the rectus muscle in the lower guadrant. The abdomen was explored with two fingers, and a hard mass was found approximately in the midline near the promontory of the sacrum. It was stony hard and was thought to represent the calcified mass of lymph nodes seen in the x-ray. A small tag of omentum presented into the wound and on this were numerous small gray areas suggesting fat necrosis. There was considerable straw-colored free fluid in the peritoneal cavity. A loop of small bowel was drawn into the wound and a Witzel-type enterostomy was established. The biopsy of omentum showed fat necrosis.

Three days later, the patient seemed slightly improved. The distention was definitely reduced, and the respirations were slower and easier. Peristaltic sounds were more normal on the third hospital day. He was started on a course of intravenous sodium sulfadiazine, totaling 25 gm. in five days. On the sixth hospital day the liver edge was felt three fingerbreaths below the costal margin and seemed rough and uneven. At this time there was definite dulness and consolidation above the high diaphragm on the right side, with increased transmission of breath and voice sounds and occasional rales. The temperature was 99.8°F., the pulse 98, and the respirations 25. The decompression tube was draining a yellowish-brown fluid, although it had not passed the pylorus. A portable flat plate of the abdomen showed definite improvement in the dilated loops, but there was one large markedly dilated loop of small bowel, probably in the upper jejunum. The nonprotein nitrogen was 90 mg. 100 c.c. the chloride 108.4 milliequiv. per liter. The serum amylase was 1.5 units (normal). The van den Bergh reaction was too low to read. The prothrombin time was 25 seconds (normal, 20 seconds). In the bromsulfalein test 30 per cent of the dye was present in the thirty-minute specimen. The urinary sediment contained a rare coarsely granular cast, a rare red cell, 10 white cells, 5 epithelial cells, calcium oxalate crystals and rare crystals resembling sulfadiazine per highpower field.

On the seventh day after admission, the temperature rose to 101° and each evening it jumped to 103°F. The pulse ranged between 100 and 110. At this time the wound became infected with Proteus vulgaris and broke down. Because of intermittent abdominal distention, barium enema, gastrointestinal-series and intravenous pyelogram studies were made. The entire colon filled readily. The colon emptied completely and no organic lesion could be demonstrated. The small barium meal was negative. The barium mixture passed through the small bowel as far as the ileostomy opening in the

usual time without evidence of obstruction or dislocation. Palpation was unsatisfactory because of the patient's condition. The intravenous pyelogram demonstrated that the kidney outlines were normal in size, shape and position. At no time was the dye visible in the kidney pelvis. However, there was a moderate amount of dye in the bladder toward the end of the examination. The liver shadow was large. The spleen was not visible. Low in the pelvis on the left side were several dense shadows they probably represented barium in the diverticulums of the sigmoid. The nonprotein nitrogen at this time was 28 mg. per 100 c.c. Owing to signs of pleural fluid, chest taps were performed through the ninth interspace on each side; 2 c.c. of what appeared to be thin blood was obtained from the right side, and 25 c.c. of similar fluid from the left.

Terminally the patient seemed slightly jaundiced. The serum bilirubin was 2.45 mg. per 100 c.c. direct, and 2.75 mg. indirect. The liver function test showed 50 per cent retention of the dye in the serum. The patient vomited small amounts of blood, and a small amount of blood drained from the enterostomy opening. The blood pressure dropped to 74 systolic, 40 diastolic, and the pulse rose to 120. In spite of supportive measures the patient died on the fortieth day after admission.

DR. T. H. BATE

The case under discussion today is that of a fifty-six year old white male who was admitted to the hospital because of abdominal pain, nausea and vomiting. The protocol is rather long, involving three pages. Numerous laboratory tests were done, numerous x-ray studies were made. In order not to review the entire history I will try to pick out the salient points upon which we might logically come to a conclusion, which of course we hope is the right diagnosis.

This patient had been bothered with colitis for about six months, supposedly proven with an x-ray. It is stated that he felt better in the day time than he did in the morning on arising. He had noticed an abundance of gas, but the stools were not described. Five days before admission he became constipated and was relieved by repeated enemas, passing a great deal of gas. Two days after this he started to vomit a thin yellow fluid and noticed an enormous distention of the upper abdomen. There is a twenty pound weight loss and a definite history of alcohol. His admitting laboratory work showed an anemia, a leukocytosis, a 2 plus albumin and a 1 plus sugar in the urine, an increased serum of nonprotein nitrogen of 122 mg. (25 to 32 being normal). The protein was depressed to 4.9. (normal being 6 to 8).

The x-ray studies revealed distention of the upper gastro-intestinal tract and a calcified mass over the 5th lumbar vertebra.

Numerous attempts to use the Miller-Abbott tube failed and an enterostomy was done. At this time, the hard mass described in the x-ray was felt to be calcified lymph nodes over the 4th lumbar vertebra. The omentum presented itself and areas were biopsied which showed fat necrosis. This might be the turning point of the whole case.

A few days later repeated physical examination revealed an enlarged liver. The NPN had fallen to 90. The protein had improved slightly coming up to 5.3. Blood sugar was 145 and serum amylase was normal. Apparently the House Staff at this time were considering pancreatic disease. Bromosulphathalein test showed a 30 per cent retention in thirty minutes, this is definitely increased, normal being about 10 per cent. The urine at this time showed a few hyaline casts.

On the seventh day the wound broke down and the patient became acutely ill. Barium enema, gastro-intestinal study and intravenous pyelograms were all described as normal. However, during the examination small diverticuli of the sigmoid were noted. Terminally, there was some fluid in the chest, a small amount described as thin and bloody. The patient was jaundiced terminally and died.

In reviewing the signs and symptoms on this case, several possibilities come to mind: *First*: Did the man have high intestinal obstruction. I do not think so, because first he passed a great deal of gas. This is characteristic of a chronic pancreatitis. The upper abdomen will distend enormously, vomiting is common and profuse, although usually thin in character, and the patient passes a great deal of gas. Whereas in high intestinal obstruction vomiting is prominent, it becomes progressively darker as the vomiting progresses. Pain is crampy and rhythmic, this patient did not have pain, and there is usually no expulsion of gas or feces. This is further borne out by the x-ray studies, namely, the nega-

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RESEARCH IN THE SERVICE OF MEDICINE **SEARLE**

tive gastro-intestinal series. The malfunctioning liver, with slight enlargement, will hardly explain the clinical picture given here. It has been shown on numerous occasions that pancreatic disease, of chronic nature is very often associated with a fatty degeneration and enlargement of the liver. It is stated by some authors that the enlargement of the liver and the fatty infiltration may be an attempt of the liver cells to supplement and aid in the digestive processes of the pancreas. Although most frequently associated with lesions of the pancreas, fat necrosis can occur under other circumstances. Traumatic fat necrosis has been found in the female breast, and occasionally it will develop in any fatty tissue subjected to trauma. In all instances, the lesion probably appears as the result of a breakdown of neutral fat by a lipase. Necrosis or injury to the tissue allows the fat to be released from cellular confines to meet the enzymes, whether it be liberated pancreatic enzyme, or a local ferment arising from the regions of traumatic necrosis. Fatty acid and glycerol are formed. Glycerol being water soluble is carried away, but the fatty acids may crystalize into irritating foreign bodies, or may unite with calcium ions into insoluble soap. Both products remain locally at the sight of injury. The calcium content of tissues subjected to fat necrosis is much higher than that of normal tissue. Perhaps the calcified masses described on x-ray and by the surgeon palpating through the incision for the enterostomy, may be the terminal results of previous fatty necrosis with the formation and union with calcium.

The symptom of abdominal pain, which was better in the daytime than at night, is also interesting and tends to lead to the diagnosis of pancreatic disease. DeCosta was the first to describe increased pain in the recumbent position, explaining that due to the retroperitoneal position of the Pancreas, the spine being hyper-extended is more apt to cause pain. As the patient is in the upright position he tends to stoop forward and in so doing relieves tension over the pancreas.

Carcinoma of the body and tail of the pancreas must also be thought of in this case. Duff points out that the clinical picture of cancer of the body and tail differs from that of cancer of the head in other respects than the presence or absence of jaundice. Spread in the cancer of the body and tail is a much more striking feature than cancer in the head. This influences the signs and symptoms. Deep-seated gnawing pain is characteristic of cancer of the body, and is explained by extensive involvement of perineural lymph spaces, as the tumor is likely to be in direct contact celiac plexus. Ascites is common and is usually due to the implantation growths on the peritoneum or the involvement of the portal vein. The spleen may be enlarged owing to the pressure on the splenic vein, which lies in the groove in the body of the pancreas. Distant metastases, both by blood and lymph stream, are commoner than in cancer of the head.

CLINICAL FEATURES OF CHRONIC PANCREATITIS

In general, chronic pancreatitis has not been considered as a distinct pathologic entity, but has usually been regarded in conjunction with chronic cholecystitis, obstructive jaundice due to stone in the common bile duct, or carcinoma of the ampulla of Vater or of the head of the pancreas. Recently, Comfort, Gambill, and Baggenstoss have emphasized chronic pancreatitis unassociated with disease of the biliary or gastro-intestinal tract as "chronic relapsing pancreatitis."

Chronic pancreatitis may be defined as a disease characterized by recurrent attacks of pain in the upper abdomen, by disturbance of parenchymatous cell function, and by rather specific sequelae; a syndrome which may be limited to the pancreas alone or may be associated with disease of the biliary or gastro-intestinal tract. Attention has been devoted to the pathologic findings of marked interstitial fibrosis and residual cystic necroses of tissue as characteristic of chronic pancreatitis. The term "hydropancreatosis" has been used to denote the condition in which the duct system is dilated above a point of obstruction with extreme atrophy of the parenchyma.

Incidence and Exciting Factors

Chronic pancreatitis may begin in childhood or late in life, but usually starts most frequently in the third or fourth decade. It occurs more often among males than among females, the ratio being about 6:1 (Comfort, Gambill and Baggenstoss). Dietary indiscretions and alcohol appear to initiate the acute attacks. Size, weight, and obesity are probably not precipating factors. Bustos (1945) stressed the possibility of

focal and systemic infection as a likely cause of chronic pancreatitis; however, Comfort et al. (1946) minimized infection as an etiologic hypothesis.

Symptoms and Physical Findings

Although there are no pathognomonic symptoms and signs of chronic pancreatitis the collective findings of pancreatic pain, dyspepsia, steatorrhea, diabetes, and occasionally a mass palpated in the epigastric region should direct attention toward this organ.

The pain in chronic pancreatitis usually starts abruptly, but is not always severe. It has been described as constant and burning, and usually, though not always, is provoked by food and alcohol, in contrast to the pain of chronic peptic ulcer, which usually is alleviated momentarily by the ingestion of food. The seizures of pain in chronic pancreatitis may continue over various periods of time, from a few days to as long as 10 to 20 years. The pain, usually steady, is frequently located in the epigastrium, although it is not uncommon in either of the upper abdominal quadrants. As in acute pancreatitis, pain in chronic pancreatitis may radiate transversely across the epigastric region, through to the back, or occasionally to the left costal angle.

The physical findings vary with the stage of the attack, which in many instances is so mild that there are no significant signs. Fever and leukocytosis, and in some cases even shock, are found. Usually there is some degree of muscle spasm in the upper abdomen. In a very thin patient with long-standing chronic pancreatitis an enlarged or cystic pancreas may be palpated as an indefinite mass. Jaundice occurs in almost half the cases with chronic pancreatitis.

Laboratory Features

Transient or persistent plycosuria represents a form of diabetes mellitus. Albuminuria is not uncommon. NPN may be elected.

Blood studies frequently show an anemia, and blood volume may fall below a normal level. Leukocytosis is a variable and an unimportant diagnostic feature. The presence of an elevated blood sugar and a diabetic type of glucose tolerance curve is extremely helpful from both a diagnostic and therapeutic point of view. The serum bilirubin determination may reveal subclinical or clinical jaundice. The blood serum amylase test may or may not be elevated, and this test is not nearly so valuable as in acute pancreatitis. Hypocalcemia noted in acute pancreatitis is not present in chronic pancreatitis.

Examination of the stool is important, and the clinical picture of steatorrhea should warrent thorough investigation. Stools may vary from large, bulky, whitish, fatty ones to those of normal consistency. Microscopically, undigested starches (amylorrhea), proteins (azotorrhea), and fats (steatorrhea) may be found.

Roentgenologic studies of the gallbladder, stomach, duodenum, small intestine, and colon may demonstrate associated pathologic conditions. A roentgengram of the pancreas will in about 50% percent of cases reveal calcification which represents a sequela of this disease. Many observers (Comfort et al.) believe the calcifications are the results rather than the cause of the disease.

DIAGNOSIS

Acute Exacerbation of Chronic Relapsing Pancreatitis.

DR. J. M. GREER

The high lights of the case are as follows:

A male patient fifty-six years old coming in with a history crampy abdominal pain, nausea and vomiting. The history reveals that about six months previously, the patient was awakened at night with crampy abdominal pain, nausea and at times vomiting. Five days before admission there were severe abdominal cramps and marked constipation. Three days later he began to vomit a thin fluid. There was no jaundice; nor tarry stools. He had lost about 20 pounds of weight in three months. He used to drink a large amount of rye whiskey to quiet his nerves but not in the last week.

The past and family history:—Not important.

Upon physical examination he looked ill, he was dehydrated, and his diaphragms were elevated, the chest movements limited but the heart and chest normal. T. P. R. was 99-94-21. The abdomen was enormously distended and peristalsis was weak. Blood Hb. 10.5 gm. reds 3 M. whites 16,000. Urine showed 2 plus alb. low specific gravity and green sugar test. The serum NPN was 122 mgm to 100 cc. (normal is 25-35) This went down to 90 and then 28 after enterostomy and treatment.

X-ray showed dilated stomach and small intestine and some large dilated loops of small intestine, colon was not dilated.

Maybe the most significant thing was a large

area of calcification overlying the area of the fifth lumbar vertebra.

A laparotomy was done under local anesthesia, going in on the left side. It seems to me that this was a peculiar way to do a laparotomy but they do doubt had their reasons. They probably only intended to pick up a loop of bowel for enterostomy and decompression as they were unable to pass a Miller-Abbott tube. At any rate the calcified mass was palpated and an enterostomy done, and some necrosis of the omentum was found.

The patient improved for a few days and the NPN went down. However, he developed liver and chest complications and a small amount of bloody fluid was aspirated from the pleural cavity and he went down hill and died on the fortieth hospital day, in spite of volumnious blood chemistry and x-ray studies and efficient treatment.

Now let us go over the case more carefully:

The above outline of history and symptomatology as well as physical examination and laboratory work point toward some pathology in the abdomen, and involving the abdominal organs, and at least manifest by symptoms involving the intestinal tract. The extreme abdominal cramps and constipation strongly suggest mechanical obstruction, but when they listened the peristalsis was weak. Was that because of the length of time or was it a mechanical obstruction? Is there anything in the physical findings that will help us? We know that there is a mass in the abdomen because it has been x-rayed and has been palpated when laparotomy was done.

This Mass:—If we knew all about it we would probably have the diagnosis of our case or would we? This mass in the abdomen in the area of the 5th lumbar vertebrae, this mass, this stony hard mass that was palpated when laparotomy was done, this mass that is calcified and shows by x-ray. I take it that this mass is hard and fixed, and in the region of the last vertebrae, and probably projected forward in the retroperitoneal area and could have interfered with the retroperitoneal blood supply. Could it be the cause of an intestinal obstruction? It is possible that it or the inflammation around it could well be. We also have to think of a mesenteric thrombosis. Is this mass inflammatory or in the nature of a new growth? If it is a new growth is it benign or malignant? As to retroperitoneal tumors, these tumors may occur anywhere in the retroperitoneal area. They may be malignant or benign and are lipomata, fibromata, myoma, chondroma, neuroma, sarcoma, and lymphadenoma, and all varieties of cysts.

We should probably take this mass for what the attendants thought it was, namely, a calcified mass of lymph nodes, and dismiss the idea of a retroperitoneal tumor, as we have very few other symptoms or signs to support it.

From the physical findings of the abdomen;—distention, large dilated loops, fluid, vomiting, with temperature and leucocytosis we must assume that he had some peritonitis and no doubt the attendants thought so too as he was given sulfadiazine intravenously. Also after many unsuccessful attempts at passing a Miller Abbott tube the abdomen was opened under local anesthesia and an enterostomy was done. Was this done because of a mechanical ileus or lleus following peritonitis? Probably the latter. The mass was palpated and necrotic masses of omentum found.

The numerous gray areas of fat necrosis on the omentum are to me significant, and make it necessary to investigate the possibility of pancreatic involvement, as a pancreatitis is the most likely thing that would cause such necrosis. This is probably the key to the diagnosis as it is a physical sign of irritation from pancreatic fluid which means pancreatitis.

We usually think of acute pancreatitis as being a sudden overwhelming disease; however this is a question of degree and there are less severe cases, and they do not all manifest the same degree of severe upper abdominal pain and shock. In the severe gangrenous and hemorrhagic forms the mortality is about 80%, and this goes on down to 10% depending upon the degree of involvement. As we know these pancreatitidies are brought on by blocking of the ducts or interference with the blood supply, from infection and thrombosis. This could well be the cause in this case.

The patient improved somewhat after laparotomy and enterostomy but on the seventh day started to have a rise in temperature and pulse and went down hill from then on.

Gastro-intestinal studies and IV pyelograms were done which probably did the patient very little good as he must have been quite ill with temperature up to 103° and pulse 110, and the protocol states that palpation was unsatisfactory because of the patients condition.

We are told that the barium enema showed that the colon emptied completely and later we are told that there were several dense shadows in the left pelvis as evidence of diverticulum of the sigmoid. Probably they do not consider the sigmoid as a part of the colon. The patient may have had some trouble with diverticulitis, which may have been a factor in the cause of the calcarious lymph nodes, and this as an etiological basis of the pancreatitis and the other abdominal pathology.

The signs of the pleural fluid and bloody chest taps developed during the last few days and are a little hard to explain except that there had developed an associated hepatitis and liver congestion which could have accounted for this finding. Also if he had developed a retroperitoneal or mesenteric thrombosis the bloody fluid in the chest could have come from this. Probably the most likely thing is a necrotizing pancreatitis and as this is a retroperitoneal organ the bloody fluid came from this.

In Summary:—

A male patient fifty-six years of age with a six months history of crampy abdominal pains, bloating, eructations, belching and much gas, indicating, at least, partial intestinal obstruction—more manifest five days before entry by extreme cramping and constipation. At the time of entering the hospital very ill with clinical peritonitis, with ileus intestinal obstruction which was only relieved by laparotomy and enterostomy, at which time omental necrosis was found. Later developing hepatitis, liver congestion and bloody fluid in the chest, ending in death on the fortieth day.

These findings, history and progress, indicate to me a diagnosis of chronic pancreatitis, later developing into an acute pancreatitis with peritonitis, with at least partial obstruction for which enterostomy was done. Liver and chest complications developed which added to the cause of his death.

One would expect to find the pathological changes in the various organs of this clinical picture.

My diagnosis would then be:

Pancreatitis, subacute and gradually developing into a necrosis of the pancreas with bloody fluid in the peritoneum and chest cavity. All this was of sufficient degree to cause death.

DIFFERENTIAL DIAGNOSIS

Dr. Arthur W. Allen: Are the original calcified areas still present in the later x-ray films?

Dr. George W. Holmes: Yes.

Dr. Allen: According to the history, this man should have had a lesion easily demonstrable by x-ray, and it is a great disappointment to me that the x-ray studies throw so little light on the problem. We have a history that is perfectly consistent with a slowly developing lesion of the gastrointestinal tract that finally produced complete obstruction. This, however, probably is not the case since I am sure that under such circumstances the x-ray studies made after the sixth day of hospitalization would have been more conclusive than they appear to be.

Starting back with the fistula operation fifteen years before admission, a fistula of sufficient dimensions to require destruction of the sphincter makes one think of the possibility of tuberculosis. The calcified areas, which I assume represent healed tuberculous nodules in the mesentery of the ileum may not have had any bearing on such a possibility. They were probably due to a healed bovine tuberculosis that he developed in childhood because of drinking raw milk. Although these calcified nodes do cause symptoms in certain cases, they rarely produce acute obstruction. Usually they are symptomless and very little attention is paid to them by clinicians, sometimes very much to the detriment of the patient.

The present illness seems to have started about six months prior to admission when he began to have crampy abdominal pain, which was usually followed by nausea and at times by vomiting. This was worse at night when he was recumbent and better in the daytime when he was up and moving around. Although we have a note a little farther along saying that for many weeks prior to admission he was in the habit of drinking a pint of rye daily, it does not state whether this habit preceded the beginning of his difficulty six months previously, and I have a feeling that that is irrelevant. He had a sufficient amount of trouble five months prior to admission so that his physician urged him to have a barium enema and x-ray studies. The x-ray studies revealed "colitis," which is a vague and indefinite term and means very little. However, at that time they probably ruled out a demonstrable growth in the intestine, and his physician was apparently satisfied to let the matter of crampy pain rest

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at the moment and possibly blamed this discomfort on the patient's alcoholic intake. He really developed a good deal of change in his bowel habits about a month prior to admission. He had previously had loose bowel movements, which is rather an unfortunate complication for a man who has a sphincter that is not functioning. However, this shifted over a month prior to admission to constipation, at that time he was aware of a great deal of gas in his bowels. Five days before admission the patient became very constipated, and I assume that he failed to have any bowel movement, that he had extreme abdominal pain and that the abdomen became distended. He was brought in here in a state of dehydration and was obviously in a very precarious condition.

At the time of entry the laboratory evidence, as represented by a high nonprotein nitrogen, a low blood choloride and a low protein, confirmed the story that he had been unable to take any food or fluid for five days. He had also a certain amount of anemia—a red-cell count of 3,000,000. He had some leukocytosis, which may or may not have been of any significance since he must have had some hemoconcentration at the time the count was made. The red herring about the green sugar test is cleared up by the negative test later. The fact that the Miller-Abbott tube failed to pass the pylorus was undoubtedly a disappointment to those who treated him, particularly since every effort had probably been made to get this tube through the pylorus. I wish to call attention at this time to a very excellent description by Dr. Abbott, of how these tubes may be passed with a fine wire stylet. This wire can be obtained from sporting-goods houses since it is made for fishing leaders. The type of material that can be brought in Boston is not exactly the size that Dr. Abbott recommends but it is effective, and by the simple technic that he describes, in approximately 24 out of 25 cases one can be sure of getting the tube passed effectively.

Dr. Clifford C. Franseen: It was used in this case.

Dr. Allen: Yes, I assumed it was; but I am sure that not enough publicity has been given to the technic. That is why I bring it up here.

The exploratory laparotomy interests me. Why did the surgeon choose the left side rather than the right? Perhaps the patient was a little more distended there, or the surgeon may have thought that he could feel a lower segment of ileum on the left. Possibly in the flat plate there was a loop presenting on the left, which gave him a lead to enter on that side. The two-finger exploration coming in contact with a hard mass, which was assumed to be this calcified mass of lymph nodes, is interesting and it may be that it finally turned out to be something else. Also the question of fat necrosis on a little tag of omentum interests me a good deal because the fluid that came from the abdomen was straw colored. In fat necrosis associated with acute pancreatitis the fluid is rarely straw colored but is blood tinged or the color of prune juice. The fact that the biopsy of the omentum showed fat necrosis is of considerable interest in the light of the type of fluid. Fat necrosis can occur without pancreatitis, but it occurs usually after trauma in the breast of subcutaneous tissues.

The man improved following ileostomy, which shows that a low loop of bowel was encountered, and undoubtedly he got a great deal of benefit not only from the ileostomy but also from the Miller-Abbott tube, which apparently remained in the stomach. They were able to feel his liver edge on the sixth hospital day. It could not be felt on admission because of the distention. It was three fingerbreadths below the costal margin and seemed rough and uneven to touch. Then the patient began to have periods of distention again but was able to withstand a gastrointestinal series, a barium enema and an intravenous pyelogram. His chemical balance had improved considerably by the sixth day, and up to that time he had had no evidence of jaundice. The prothrombin time was only slightly elevated. Although the record does not say so, the probabilities are that he had been given synthetic Vitamin K prophylactically. He certainly had a good dose of sulfadiazine, which raised the blood level to 17.6 mg. per 100 cc. Although it seems from the record that this drug was not started until the third day after admission, it is likely that it was started before that time. However, this did not prevent the patient from having a certain amount of infection in the wound. Nearly all enterostomy wounds become infected, and this wound behaved about as one would expect it to.

Interestingly enough the patient developed a high temperature on the seventh day; it went up to 103°F. each evening, and the pulse rose. That could have caused the elevation of the

diaphragm, which was not reduced by the relief of the distention? Then the question comes up. What was the thin bloody fluid in the chest? Since so little was withdrawn the probability is that there was not so much fluid there as they had suspected.

Then there comes a big hiatus in the history. We have a good deal of detail up to the seventh day, and then a very brief description of the last few days of the patient's illness. Terminally, he became jaundiced, and the liver-function test showed 50 per cent retention; he vomited small amounts of blood, and a small amount of blood drained from the enterostomy opening. He died on the fortieth day after admission, which is exactly the right time for a patient to die with necrotizing pancreatitis. The patient that almost but does not quite survive pancreatitis is very apt to live just about six weeks.

This man's story is very confusing and it brings up a lot of interesting points. One may hazard a good many guesses about where the underlying pathologic process really was but the chance of being right, so far as I am concerned, is very remote. The patient could perfectly well have had an ileus without having either an intrinsic or extrinsic lesion in the bowel; that is, the ileus could have been on the basis of gastritis and alcoholism. However, he had lost 20 pounds in weight. This man was developing a disease that manifested itself as an acute picture when he came in but actually was an end result of something that had been going on for a period of nearly half a year, possibly longer. It is conceivable that he could have had a reactivation of his mesenteric adenitis. When I saw the first film and read the story, it occurred to me that possibly this was going to turn out to be a gallstone ileus, but I now believe that the film does not have the appearance of a gallstone in a loop of small bowel. One might consider that this was really just cirrhosis of the liver, and pin everything on that as a diagnosis, but there is very little evidence of that.

The palpation of the liver, the size of the liver, the ileus and so forth, are compatible but I think such a diagnosis is rather farfetched. The patient could have had, I suppose, some chronic situation in the pancreas that might have led up to an acute episode of this sort, but it seems rather unlikely. It is certainly not the usual history for a man to have a warning six months prior to the time he comes down with pancreatitis, which usually comes out of a clear sky without any long prodromal history. One has to think of tuberculosis, as I mentioned earlier in the discussion, because there is some evidence of certain types of tuberculosis in his past history. I am not sure about the chest; I should suppose that Dr. Holmes would say it was clear so far as any chest lesion is concerned.

That brings us down to the possibility of a lesion in the small intestine of a carcinomatous nature, which might conceivably have been overlooked. It is possible that such a lesion in the small bowel migth have been between the point of ileostomy and the portion of the ileum filled from the barium enema. I think that is the most likely diagnosis. The reason I think so is that it is the one area that could not be definitely ruled out by the surgeon and that could not be studied by the x-ray man, using contrast mediums. The next best possibility is some extrinsic neoplasm secondarily involving the bowel. In this instance I assume that the liver was full of tumor and that is what was the matter with the liver, not cirrhosis.

Dr. Holmes: May I add a few points? In these films it does not look as if the liver conforms to the clinic interpretation. It is a little large but not abnormal in shape. The hepatic flexure is not displaced downward. I wonder if you put enough weight on the fluid in the left pleural space. There was some fluid there earlier, and later a considerable amount.

Dr. Allen: The patient could have had carcinoma involving the diaphragm, or a primary lesion of the lung, if you choose. I am not worried about the chest picture. In carcinomatosis of the abdomen one often sees fluid in the chest, many times because the diaphragm is studded with carcinoma.

Dr. Franseen: The site of the ileostomy was chosen because at the time of the flat film the point of obstruction appeared to be in the ileocecal region and we wanted to reserve the right lower quadrant for the second operation.

Dr. Dwight L. Siscoe: I followed this patient very closely outside the hospital. Dr. Allen included all diagnoses that we were interested in and considered some more too. There were a few points that Dr. Allen questioned. One was the alcohol. The alcohol made a much greater impression on our minds than the record here would suggest. The roentgenologist who

first examined him was greatly impressed by the gastritis and the amount of alcohol consumed. In fact we received word that he had been using a quart a day instead of a pint. So the possibility of cirrhosis was very much in our minds. During the last few days of his life the patient ran a steady downhill course, and a few days before death one observer believed that he felt a mass in the right lower quadrant.

Dr. Franseen: The patient was scheduled for operation, but that morning had a large hemorrhage and the operation was called off. That was twenty-four hours before death.

CLINICAL DIAGNOSIS

Carcinoma of stomach?
Portal cirrhosis?

DR. ALLEN'S DIAGNOSIS

Carcinomatosis, involving the lower ileum.

ANATOMICAL DIAGNOSIS

Pancreatitis, hemorrhagic, subacute.
Fat necrosis, extensive.
Rupture of splenic artery and vein.
Erosion into duodenum, with massive gastrointestinal hemorrhage.
Chronic cholecystitis.
Cholelithiasis, with stone in ampulla of Vater.
Tuberculous mesenteric adenitis, healed.
Arteriosclerosis, moderate: aortic, coronary and renal.

PATHOLOGICAL DISCUSSION

Dr. Tracy B. Mallory: An autopsy innumerable foci of fat necrosis covered the peritoneal surfaces from the bottom of the pelvis to the inferior surface of the diaphragm. The entire pancreas had been destroyed, and the retroperitoneal tissues of the upper portion of the abdominal cavity were occupied by a huge blood-filled cavity with shaggy, necrotic walls. Into this cavity dangled the ends of the splenic vein and artery, neither of which was thrombosed. A spontaneous rupture had occurred into the posterior wall of the third portion of the duodenum, so the terminal event was evidently hemorrhage from the splenic vessels into the cavity and hence into the duodenum, filling the gastrointestinal tract with blood. It was interesting that both pleural cavities contained small amounts of clear strawcolored fluid so the supposed chest tap must have penetrated into the retroperitoneal cavity. The extremely high diaphragm made this readily possible. The liver was at the upper limit of normal in size, weighing 1800 gm., and was not nodular or cirrhotic. It did show extensive acute central necrosis, which accounts for the terminal liver insufficiency.

This man had the classic setup for acute pancreatitis. There was a severe chronic cholecystitis with innumerable small stones. The prodromal symptoms that led Dr. Allen to trace the onset of his illness back at least six months may well, in retrospect, have been due to his gallbladder. There was likewise a small stone in the common duct partially imbedded in the mouth of the duct of Wirsung. There was thus a real possibility of reflux of bile into the pancreatic duct. It must be admitted, of course, that few cases of pancreatitis show a calculus in the appropriate location.

Dr. Allen: The straw-colored fluid, five days after the pancreatitis started, is the thing that bothered me. Do you believe that that is usual? We frequently do a paracentesis to make a differential diagnosis between pancreatitis and perforated ulcer, and things of that sort, and we rely on the character of the fluid to guide us.

Dr. Mallory: I should consider clear yellow fluid unusual too.

Dr. Allen: The serum amylase determination, so far as I could tell from the record, was not done till the fifth or sixth day, so that it had to be thrown out as a guide. If that had been done the first day I think it would have had more significance.

Dr. Joseph C. Aub: Why does a patient with pancreatitis die on the fortieth day?

Dr. Allen: It takes just about that long for the pancreas to become completely necrotic and erode a big vessel, usually the splenic artery.

Dr. Siscoe: I am sorry Dr. McKittrick is not here to discuss this case, since he held out for the diagnosis of pancreatitis almost from the start. He believed that the intra-abdominal fat necrosis could be explained in no other way.

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TOPICS OF CURRENT MEDICAL INTEREST

REPORT OF THE DELEGATE

Clinical Session, American Medical Association
Cleveland, Ohio, Dec. 5-8, 1950

Preceding the opening of the Clinical Session, and the meetings of the House of Delegates, the Third National Medical Public Relations Conference was held. Emphasis was placed upon several fundamentals which constitute a well rounded program of public relations. It was emphasized that the *Individual physician* was the base upon which all good public relations could build a pyramid extending up thru the County, State and National Organizations. From this Base, the Individual Physician, thru his education and practise of good public relations, emanate all other plans and procedures, ideas and ideals, so that collectively, thru the County Medical Society, a program of good public relations can be promoted in various communities, the work of the State Society on a more extensive basis; and the overall program aimed at a national audience through the educational and public relations program of the A.M.A. Good public relations must stress the individual physician-patient relationship as the keystone to a successful program. Each individual and county medical society should ask themselves the following questions: Is 24 hour emergency service maintained in your community? Are you willing to care for patients when they call at 2:00 A.M.? Is there emergency telephone service to the hospitals. Are the charges for services in line with an average charged by physicians in your community? Is there an attempt to maintain an average and fair fee schedule? Are charges for services explained first, instead of waiting for a patient to criticize the fee as unfair or exorbitant? Are these problems discussed in county medical society activities with new members of your Society? Or to acquaint new members with local customs? Does your county medical society insist that each member read and become acquainted with the "Principles of Medical Ethics," and your Constitution and By-Laws? Does your county society have a grievance committee that really functions? Do you have a good press relations committee to iron out difficulties in public relations? Do all the people in your Community receive good medical care? If not, what can be done to facilitate this care? Many other questions could be asked.

If then, good public relations begin at home, what does your receptions room look like, and what have you done today, if anything, to break faith with your professional endeavors, and cause one break in the chain of Good Public Relations?

Another important event at the Clinical Session was the reading before the House of Delegates, and all others assembled, of a paper prepared by William L. Hutcheson, President, United Brotherhood of Carpenters and Joiners, and Vice-President of the American Federation of Labor. This paper represented the first definite indication that a large segment of organized labor, thru its President, had joined hands in its struggle to defeat compulsory health insurance in this country. The address was broadcast nation-wide over the A.B.C. network. Mr. Hutcheson stated in his paper: "I am against socialized medicine. So is the organization which I have the honor of heading." (700,000). His concluding paragraph—Quote—"I have always respected the medical profession for the fine contribution American Medicine has made to human Welfare. As I watched your battle against regimentation during the past two years, I have added to that respect. The physicians of this country have shown that they are willing to fight for their convictions. I salute you today not only as doctors but as crusading citizens as well. We in the labor movement have our own cross of regimentation to bear. The fight you are making is part of the same war. It is a war against concentration of authority in a few hands in Washington. As a veteran of forty years in the labor movement, I know what it is to fight for human rights. I am happy to take my stand beside you." Unquote.

At this session of the House, through a public announcement by the Chairman of the Board of Trustees, the A.M.A. appropriated a half million dollars as a nucleus of a fund to be raised for the aid of medical schools. That fund, with-

in a few hours after the Board's decision had been announced, had been swelled by thousands of dollars spontaneously pledged by individuals and from other sources. It was the A.M.A.'s evidence of concrete action in its opposition to Federal Subsidies for the medical schools as offered in bills introduced in the last Congress. It is hoped that this fund will be augmented and will act as a "stimulus to other professions, industries, businesses, labor groups and private donors to contribute to this very important cause of protecting and advancing the interests of medical education and public health."

And now for a discussion of some of the other subjects before the House of Delegates.

1. The Board of Trustees asked the conference if it desired to continue the Clinical Sessions. The Reference Committee called attention to Article 2 of the Constitution which says. "The objects of the Association are to promote the science and art of medicine and the betterment of public health." It recommended continuation of the Clinical Sessions, and the House adopted its report. The House selected St. Louis as the site for the 1953 mid-winter session. Next year session will be held in Houston, Texas, and Denver in 1952.

2. A Resolution was introduced into the House relating to the problems of Alcoholism. It was adopted in substance, but referred to the Committee on Chronic Diseases, instead of creating a new committee of the House.

3. The A.M.A. Committee on Blood Banks, in its report to the Board and House, emphasized that the national emergency blood program "is and must continue to be a three pronged activity, each part of which must be developed to keep the whole program in balance. The three part are: a. furnishing of whole blood and plasma to the Armed Services. b. maintenance of supplies of blood and plasma for normal civilian requirement; c. the development of dispersed reserve supplies of equipment for collecting blood and dispersed reserve supplies of blood plasma for civilian defense. The Committee urged each state medical society to establish a state committee on blood banks whose function it would be to correlate the elements of the emergency blood program in its state and to see that blood procured is properly channeled. These committees should include representation from hospitals, blood banks, and Red Cross. A state committee could function so that there would be no duplication of effort, overlapping of blood procurement by different organizations, and avoid the confusion resulting therefrom.

4. Facts about the A.M.A. dues. Dues for 1951.

Fellowship dues for 1951 are $5.00; and are exclusive of $25.00 for membership dues.

A.M.A. dues are payable through the component county medical society or the constituent state or territorial medical association, depending upon the method adopted locally.

Fellowship dues are payable directly to the headquarters of the A.M.A. on receipt of a bill for such dues.

A dues paying, acting member is eligible for Fellowship and may request such status by direct application to the Secretary of the A.M.A. Applications for Fellowship are subject to approval by the Judical Council.

An active member of the A.M.A. may be excused from the payment of membership dues when it is deemed advisable by the Board of Trustees, provided that he is excused from payment of full dues by his component society and state association. The following may be excused (a) members for whom the payment of dues would constitute a financial hardship, as determined by their local medical society; (b) members in actual training for not more than five years after graduation from medical school, and (c) members who have retired from active practice. "Honorary" members, who are also active members of their societies are not excused from payment of dues, even though they do not pay dues to their local societies.

Membership dues in the A.M.A. includes a subscription to the Journal of the A.M.A. Active members who are excused from payment of dues will not receive the Journal except upon payment of the regular subscription rate of $15.00 per year.

An active members is delinquent if his dues are not paid of Dec. 31 of the year for which dues are prescribed, and shall forfeit his active membership in the A.M.A. if he fails to pay the delinquent dues within thirty days after a notice of his delinquency has been mailed by the Secretary of the A.M.A. to his last known address. A member so dropped for non-payment of dues cannot be reinstated until such indebtedness has been discharged.

The apportionment of delegates from each constituent association shall be one delegate for

each one thousand (1,000) or fraction thereof, dues paying active members of the A.M.A. as recorded in the office of the A.M.A. Secretary on Dec. 1 of each year.

5. *Council on National Emergency Medical Service*:

The report of the Reference Committee on the Council on National Emergency Medical Service should be of interest. This Council has been active with other groups in working out details necessary for an adequate Civil Defense program, and in the procurement of medical officers for the Armed Services. American medicine must exert a forceful, dynamic leadership in the civil defense program of the nation at national, state and local levels, and following recommendations were made and adopted.

a. that each state seek adequate representation on civil defense advisory committees at all levels of government.

b. that the A.M.A. request appointment of an advisory committee of civilian physicians in the new Civil Defense Administration.

c. that a copy of the report of the Council on National Emergency Medical Service be sent to all secretaries of state and territorial associations, and State Chairman of Emergency Medical Service Committees.

d. That the Council on National Emergency Medical Service and the Committee on Blood Banks have some appropriate space in the A.M.A. Journal so that information regarding actions and recommendations of these committees can be brought to the attention of our members.

e. That the State Committees on Emergency Medical Service complete their programs without delay if they have not already done so, and stress the importance of their work in the overall civil defense program.

6. *Hospital Standardization*:

The Board of Trustees has given serious attention to the acute and ticklish problem of hospital standardization, which arose last June after the American College of Surgeons relinquished this task. At joint meetings with representatives with other interested groups, it was suggested that a joint commission be established representing the four major groups, namely the A.H.A., A. C. of S., the A. C. of P. and the A.M.A. A rough draft of a proposed constitution and by-laws has now been prepared by a joint committee of these groups, negotiations are in progress, and much advancement has been made. Every effort will be made to reach satisfactory arrangements.

7. *Resolution on Council on Federal Medical Services*

This resolution was adopted after study by the Board of Trustees and the Council on Medical Service. The Council's Committee on Medical Care of Veterans will be changed to the Committee on Federal Medical Services. The Council on Medical Service will enlarge this Committee to meet the requirements of the specific functions enumerated in the resolution; that is,

a. Advising the Board of Trustees on all aspects of the several forms of federally supplied medical care either now or to be established.

b. Serving the Board of Trustees and the Association in conference with and in representations to both non-governmental and governmental agencies interested in the several forms of federally supplied medical care, and

c. Advising the House of Delegates at each of its regular and special sessions of any policy or change in policy of the Association relating to the several forms of federally supplied medical care which may require its consideration and action.

8. The House of Delegates adopted a resolution at this session instructing the Board of Trustees to seek amendment to the Federal Law on Workman's Compensation to the effect that all covered federal employees be granted *free choice of physician* for injuries sustained in line of duty.

9. Upon recommendation of the Council on Scientific Assembly, the House adopted a resolution creating a new Scientific Section of the A.M.A. to be known as the Section on Military Medicine.

10. *Constitution and By-Laws of the A.M.A.*

The Interim Committee on Constitution and By-Laws made a lengthy report to the House of Delegates, suggesting many changes which were accepted by the house upon recommendation of the Reference Committee and which will be acted upon formally at the next meeting in June. The House also adopted the suggestion that a permanent Committee on Constitution and By-Laws be created, which would serve as a fact finding and advisory body to study and

report on matters pertaining to the Constitution and By-Laws. This Interim committee also studied a resolution which would provide for one general classification of members in the A.M.A. The Committee members were unanimously opposed to this amendment which would change the present distinction between a Member and a Fellow. The recommendation was supported by the House.

11. *State Cash Sickness Disability Benefits* (Temporary).

Pending establishment of an over-all policy reflecting the attitude of organized medicine toward these programs as adopted in a few states and contemplated in many others, the following four minimum safeguards were adopted, to act as guide in this field of study on the part of physicians: (1) In the case of possible legislative enactment the prevention of abuse and extension of the program into allied fields. (2) Limitation of benefits to cash indemnity only. (3) Limitation of physicians duty to reports on diagnosis, prognosis and ability to work, and (4) Provision of medical supervision or review for maintenance of suitable standards of reporting.

This subject has been under careful study by the Council on Medical Service during the past year, but a complete digest of the material which has been assembled by the Council Staff has not yet been completed, so that it was thought best not to attempt the formation of a complete policy respecing the best methods of providing such coverage under these State Laws.

12. *Resolution on Medical and Hospital Care of Veterans with Non-Service Connected Disabilities*

Resolutions dealing with this subject were received from Tennessee supported by Michigan, Wisconsin and Louisiana, and another one from Pennsylvania. The House adopted the recommended proposals of the Reference Committee on Insurance and Medical Service wherein the Board of Trustees was authorized to permit the Committee on Legislation of the A.M.A. to offer its services to the government authorities of the Veterans Administration, or to the Congress, in seeking either administrative or legislative support for the following three principles: (1) The best possible care of all veterans with service-connected disabilities in Veterans Administration facilities; (2) the best possible care of veterans with non-service connected disabilities who need financial support, and (3) veterans with non-service connected disabilities who are able to do so should provide their own care.

This Clinical Session of the A.M.A., aside from the scientific program for general practitioners, and the meeting of the House of Delegates, was highlighted by the two day Public Relations Program and the afternoon program developed by the National Educational Campaign Committee together with Whitaker and Baxter, wherein the accomplishments of this department of the A.M.A. were reviewed. These meetings were attended in full by your delegate and by the Executive Secretary of our State Association, Mr. Robert Carpenter. The weather in Cleveland was usual for this time of year, snow, cold, rain, smoke, smog, sleet and fog. It was nice seeing the sun again somewhere on the way home, where we were re-routed with several prolonged stop-overs due to inclement weather throughout the midwest.

Respectfully submitted

Jesse D. Hamer, M.D., Delegate

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By GUILLERMO OSLER, M.D.

Bits and bites of the RELATIONSHIP BETWEEN MEDICINE AND THE LAW are contained in a symposium reported by the Annals of Western Medicine and Surgery (published by the Los Angeles County Medical Ass'n.) . . . The symposium included several California experts, visiting-professors Roscoe Pound, Ford of Harvard, Gradwohl of St. Louis, Moritz of Western Reserve, etc. . . . It seems worth more than the 25 cents which the journal costs.

A new DEODORANT against hospital odors is described by Dr. Philip Brown of Detroit, in 'The Journal' of Michigan . . . The material is odorless, is a quaternary ammonium compound, can be used in toilets, psychiatric wards, and even (safely) in solution for spraying wounds with a fetid odor. It is bacteriostatic, with a phenol coefficient of 200 to 400 against various staph and strep strains. . . . It is made by the Associated Laboratories, Inc., of Ann Arbor, and could be worth a trial.

The MORTALITY FROM ACUTE APPENDICITIS is decreasing, as one might hope. . . . Hawk, Becker, and Lehman of the University of Virginia Hospital have compared 1,069 cases from the 1933 to 1937 era with 1,003 cases from 1943 to 1948. The mortality from the earlier period was 3.27%; and that of the recent period was 0.8%. . . The decrease was ascribed in part to chemotherapy and antibiotic agents, especially streptomycin. . . . The data suggest that early operation, under modern conditions, has no advantage over conservative therapy for localized appendiceal peritonitis, but that it may have for diffuse peritonitis.

Appendicitis, incidentally, has one odd cause in Detroit. Raferty, et al., have examined specimens from 2,135 cases, and found HISTOPLASMOSIS to be the cause in 5 per cent.

Number Five on our list of methods for converting SALT SEA-WATER TO FRESH WATER has recently been described. It will interest a man in a boat, but not the population of arid Arizona and California areas. . . . Three-fourths of a pound of powdered silver fluorosilicate is added to one gallon of water. The solid salts are allowed to settle, and are then removed. The magnesium and the fluorosilicates are brought down by the addition of half an ounce of lime. The clear water is then potable. . . . All rights have been assigned to the U. S. Government.

A series of papers on PEPTIC ULCER in the Annals of Surgery has demonstrated several points. . . . Moore, et al., of Boston believe that a fraction of ulcer patients (called 'progressive virulent ulcer disease') do badly with conservative therapy, and should have definitive surgery as soon as diagnosed. . . . Hinton of New York believes that a chronic penetrating duodenal ulcer should be removed in toto, to prevent leakages after surgery. . . . Dragstedt and colleagues report the fasting nocturnal gastric secretion to be 3 to 4 times normal in a patient with duodenal ulcer, and to be reduced to one-fifth after complete vagotomy. The 'nervous phase' accounts for about 80% of the gastric secretion, the 'antrum phrase' 15%, and the 'intestinal phase' 5%. . . . Glenn of New York warns that secondary operations for ulcer succeed in only 50% of the cases, the mortality rate is high, but the procedure need be rare if the first choice surgery was well and wisely done. . . . The management of massive bleeding from a peptic ulcer is still controversial. Patterson of New York considers the problem a surgical one and resects one out of every three with a 6% mortality. Cole of Chicago operates on some of the bleeders, transfuses them all (as he says everyone does). . . . Paine, and Witebski, say that patients who are Rh negative and have never been transfused may receive Rh positive blood for 72 hours without hazard. . . . Bowers and Rossett of Memphis carried all but one of 150 cases through the emergency without surgery, and gastric resection was done later on 24 of the patients. The overall mortality was 1.3%. . . . The medical therapy consisted of absolute bed-rest and quiet; no tobacco; sedation, with barbiturates rather than opiates; psychotherapy; a Meulengracht regimen, but with feedings every 2 hours night as well as day, with a bland protein diet; neutralizing powders in milk for night feeding; and alkalis and antispasmodic drugs if vomiting is present.

What a change just a few hundred years can make. 'Drug Topics' tells of the superior healing qualities which SINGLE, MALE PHYSICIANS were supposed to possess in the 15th century. Today an unmarried GP, or especially an OB-GYN man, would have about as much chance of making a living as a witch-doctor. Maybe less.

Arizona is extremely lucky to have the basic work which was done on FLUORINE in water by the Smiths of the University of Arizona. They have mapped the status of water supplies all over the state, and the dentists and USPHS have since carried on with the clinical usage. . . . The contrast with other states is sharp. California is checking teeth and water where indicated and when forced to, far in arrears of the Arizona knowledge, and even farther from the fluorinization work of several mid-western states. . . . Viva Smiths!

Surgical treatment of bronchial asthma was discussed at length by the American Ass'n. for Thoracic Surgery in the spring of 1950. The results were not as promising as had previously been hoped. . . . The following comments were notable,—The treatment is 'empirical'. Denervation of the lung, or 'plexectomy' should be bilateral. The results are better when denervation is combined with resection of infected lung, or 'trigger' areas. The average percentage of severely asthmatic patients relieved is less than 50%, especially at a late date. Vagal section is not wise. Pioneers in the therapy are not enthusiastic, but urge work on the method. Cortisone, a heretical medical method, was mentioned as a further reason for surgical caution by Drs. H. J. Stanford of Tucson and Emile Holman of San Francisco.

Now and then the thought occurs "Why hasn't science replaced the old fashioned sources of certain chemicals? Why do they still extract Vitamin A from fish livers?". . . . It has, and they do not. . . . Reliable synthetic METHODS FOR PRODUCING VITAMIN A have recently put the shark-fishing industry out of business in many areas. The shark livers at Salerno, Florida were once worth $500,000 annually, now almost nothing.

Medical science edges in on the disease which do not yet perfectly respond to treatment by endlessly using and combining new drugs and methods. . . . Nitrogen mustard has been of value for lymphomas, but has damaged the hematopoietic system too much to be of value against neoplasms. Regional radiation has been of some value because of its selectiveness. . . . Klopp and his colleagues in Washington, D. C. have combined the best part of the two methods when they discovered that NITROGEN MUSTARD SEEMS HELPFUL WHEN INJECTED INTRA-ARTERIALLY, INTO A PART. They report the method in Annals of Surgery, and someone will soon find a use for it and provide another small step forward.

ODDS AND ENDS—A means for 'fixing' the position of sandbags on a bed has been described. The idea makes one jealous. Pillows are constructed with pockets for the sandbags, the leg is placed on the pillow between the bags, and the whole setup is thereby localized.

The Unitarian Committee of 5 clinicians and 5 basic science professors has just returned from an inspection of THE GERMAN PRACTICE OF MEDICINE. Dr. Dillon of Pasadena reports that medical service for most of the people is terrible, chiefly due to the war. Socialized medicine is of long duration, but in a sad status. The Hitlerian Reich had no notable effect on the system, since it was set before that time. (Most of the medical atrocities during the war were performed by military rather than civilian physicians). . . . The educational situation contains many dreary aspects. Each basic science and clinical department has its own building. The former are beautifully equipped. The latter are self-sufficient units, with re-duplication of facilities and almost no consultation between services. The hierarchy of seniority is iron-clad, and the 'chief' is absolute boss over his underlings and patients. He is also very versatile in all branches of his specialty. . . . The status of students is most bleak. They study medicine for prestige; 3 out of 4 DO NOT INTEND to practice medicine; NONE will get a chance to practice unless he emigrates from Germany, since there are tens of thousands now waiting in line for licenses. Doctors can find no place to live, and they almost never move from the site of education.

The 'West Coast Druggist' has a column called 'Medical Progress' which is an odd combination of a pharmacy journal and the theatrical paper 'Variety'. . . . The terse style includes such abbreviations as '&', 'National Malaria Soc', 'phcy', 'Terramycin Cures', 'chlor-Trimeton Cited', etc. . . . An advertisement next to the column is even more intriguing. It says,—"Stick 'em up, Pardner (by the cash register that is); there's gold in them thar pills." The pills are "Sleep-eze', the 'non-habit forming sedative'. We may be intrigued into finding what they contain, and add it to this paragraph. . . . (The contents turn out to be hycosin, phenacetin, and sodium bromide).

Quote, from the Ohio State Medical Journal, "They are now saying that it is unwise to attempt treatment in cases of azoospermia and oligospermia without first performing a testicular biopsy, WHICH AFTER ALL IS A MINOR OPERATION." . . . The underlining is ours. There is probably none except our distaff colleagues who does not cringe at the thought of such a biopsy. It is the sort of loose talk which produces castration complexes, or maybe a phobia of urologists!

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PERSONAL NOTES

At the December 18th meeting of the Staff of St. Monica's Hospital Phoenix, the following officers for 1951 were elected. *Dr. Robert S. Flinn,* Chief of Staff; *Dr. Paul Jarrett,* Vice Chief of Staff; *Dr. A. I. Ramenofsky,* Secretary.

Dr. Joe Boyes, Los Angeles, California, spoke to the staff of St. Monica's Hospital, Phoenix on the subject of "Treatment of Hand Injuries."

Dr. D. A. Polson, Phoenix, addressed the staff of the St. Monica's Hospital, Phoenix, on a "Case Report-Arteriovenous Aneurysm About the Knee Joint." This was at the December 18th monthly staff meeting.

Dr. James M. Greer, Phoenix, leaves for Washington, D. C., January 11, 1951 to attend the session on procurement of medical officers for the armed services. He represents Arizona at the meeting. Bob Carpenter, Executive Secretary of the Arizona Medical Association will accompany Dr. Greer.

Dr. Clarence G. Salsbury, Phoenix, Chief of Preventive Medical Services of the State Department of Health, reported in the December issue of Arizona Public Health News, on the rather deplorable sanitary conditions in the migratory labor camps in Arizona. Physicians in these areas can help by promptly reporting communicable diseases in time to ward off serious epidemics.

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A direct writting electrocardiogram "Cardiotron" has been loaned to the Arizona Heart Association clinic at the Good Samaritan Hospital by the Waitt-Randolph Equipment Co., Phoenix.

This unit will be used as part of their cardiac survey.

The Waitt Randolph Company also has available a motion picture of the research done by the E. R. Squibb Co. "Pronestyl Hydrochloride" and can be made available without charge at any clinic meetings.

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YOUR GRIEVANCE COMMITTEE

In December, 1949, the House of Delegates of the American Medical Association, by resolution, voted commending those constituent State Associations that had already established committees to hear any complaints of the public and urged that all constituent Associations adopt comparable programs. Subsequently, through actions of your Council and House of Delegates in Annual Session this year, following exhaustive and deliberate study of the procedure with all its ramifications, it was determined to undertake such a program and authorize the creation of a Grievance Committee.

The purpose of this Committee is to improve physician-patient relations and endeavor to moderate misunderstandings between the public and the profession. While the public relations value is purely a secondary consideration, the primary objective is to see that the public interest is fairly and honestly served and to correct misunderstandings and abuses which the patients think have occurred. Experience has proven where such course is pursued that it not alone builds for good public relations but in reality performs a service to the profession itself.

As in any trial procedure, certain "charges" were prescribed by the House of Delegates for Committee operation, and they are recited below for membership edification:

The Grievance Committee of this Association shall:

1. Act in fact as its "grand jury" for investigating complaints from both the lay public and within the profession concerning professional conduct and ethical deportment and likewise initiate investigations where, in the judgment of the Committee, it is determined advisable.
2. Initiate and prosecute, just as would a grand jury in civil proceedures, charges against any physician deemed by it guilty of unprofessional conduct.
3. Have no final jurisdiction in a judicial way. Just as would a grand jury, it shall receive and pass its own judgment upon evidence, but it shall not assume authority to discipline any physician. It shall lend itself to arbitration and may, at any time, express its advice and recommendation to Council or a member Society on any matter pertaining to professional conduct.
4. In pursuance of its function as a grand jury within the structure of the Association, the Committee shall have the power and authority to summon members of the Association to appear before it, either in connection with complaints involving the members summoned or as witnesses in cases involving other members. In the event any member should fail to respond to such summons, the Committee may determine to cite the member before the Council for contempt proceedings.
5. Be appointed by Council to include a total

of five selected from the panel of Past Presidents, none of which shall be active members of Council.

On January 7, 1951, your Grievance Committee met in Phoenix, Arizona, for the purpose of organization. George O. Bassett, M.D., of Prescott, was duly elected Chairman of the Committee, whose membership in addition to Dr. Bassett is presently composed of Dan L. Mahoney, M.D., Tucson; Hal W. Rice, M.D., Bisbee; and O. E. Utzinger, M.D., Ray. It is anticipated a fifth member will be appointed by Council shortly to complete the membership. Necessarily certain policy essential to the successful operation of this body was outlined, and the following rules and regulations of procedure adopted:

1. The main purpose of this Committee is to take preventive measures and a preventive attitude.
2. All complaints to be considered by this Committee received from either the lay public or within the profession must be reduced to writing and properly signed.
3. On all matters of unsatisfactory services and fees, a letter will be written to the physician with a copy of the complaint attached requesting his or her comment and report to the Committee, with the suggestion that the physician at that time endeavor to confer with the complainant on the charge in an endeavor to arrive at an amicable solution.
4. The complainant shall have acknowledgment of his letter and advised that the physician has been communicated with, a copy of the complaint filed with him and likewise suggesting that the patient take steps to confer with the physician in an endeavor to arrive at an amicable solution.
5. The physician charged with a complaint will be requested to submit his report within 10 days from receipt of notification of the filing of the charge and a follow-up letter forwarded upon failure so to do.
6. On filing of the physician's report the Committee shall decide whether the grievance is justified and what action shall be taken.
7. If the complaint cannot be satisfactorily adjudicated between the two individuals and the complaint in the opinion of the Committee seems justified and it seems advisable, the Committee will continue further investigation and will request that the two interested parties appear before the Committee to be heard individually at a specified time and place.
8. In all instances where the Grievance Committee cannot successfully adjudicate the differences between the complainant and the physician, wherein the physician refuses to abide by the recommendation of the Committee, a copy of the file shall be forwarded to the respective county medical society for any action it shall deem necessary.

In was the unanimous viewpoint of the Committee that it should be called together in meeting at sufficiently frequent intervals in order that no case will go without decision for an unreasonable length of time.

It was further determined in the instance of Maricopa County and Pima County Medical Societies wherein a similar Grievance Committee has been organized and is operating, that they be notified of the receipt of any and all complaints filed with this Committee involving a member of its society, furnishing said Committee with a copy of the complaint so received and requesting that said Committee immediately advise the state Grievance Committee whether or not it may elect to consider the charge or whether it is the desire that the state Committee shall handle the case. In the instance where a society Grievance Committee elects to handle the complaint it shall be requested that a copy of its findings and decision be filed with the state Grievance Committee.

The Arizona Medical Association is proud to be listed among those 34 of the American Medical Association's 48 constituent State Medical Associations who have thus demonstrated their continued interest for the welfare of their physicians' patients, and calls for the full support and cooperation of all those concerned. As commented upon recently editorially: "Thrashing out differences usually promotes better understanding. The members of the Arizona Medical Association have recognized that these truths apply to their business—and their customers—just as they do in other fields . . . seeking a sympathetic understanding with their 'customers,' the profession is effectively combatting trial of England's health plan here."

BOOK REVIEWS

Methods in Medicine, The Manual of the Medical Service of George Dock, M.D., Sc.D. formerly Professor of Medicine, Washington University School of Medicine; Formerly Physician-in-Chief, Robert A. Barnes Hospital, St. Louis by George R. Herrmann, M.D., Ph.D., Professor of Medicine, University of Texas Medical Branch at Galveston; Director of the Cardiovascular Service and Heart Station, University of Texas Hospitals. Consultant in Medicine to the Surgeon General, U. S. Army; Consultant in Vascular Diseases to the Marine Hospital, U.S.P.H.S. Second Edition, Completely revised. A volume of 488 pages, published by The C. V. Mosby Company, St. Louis, 1950, Price $7.50.

This reviewer is amazed at the amount of practical information contained in one comparatively small volume. Furthermore this information is orderly arranged so that information needed on any one subject is either found altogether in the same place or made easily available elsewhere by easy cross reference methods. The information for the most part is specific, brief, unencumbered by necessary detail and is surprisingly up to date. It is a pleasant surprise to note how many of the very recently discovered drugs are mentioned and directions for their use given in conditions in which they are indicated.

The book is divided into five parts entitled (1) Methods of Routine Case Study, (2) Clinical Laboratory Procedures and Tests, (3) Methods of Clinical Investigation, (4) Therapeutic Methods, (5) Dietetic Methods. In the first part there is a chapter on history taking and physical examination giving a detailed outline with sufficient explanatory notes for taking the general history, review of systems, routine physical examination and a brief guide for other studies in doing a complete study on a patient. In other sections of the book most of the usual and many of the unusual laboratory examinations are given with the technics for many of them being given in the book and references as to where technics can be found given for some of the more unusual procedures. There is an outline for the management of the various emergencies, outlines for studies of various types of disease conditions and directions for various therapeutic procedures even including directions for Scotch douche. In the section on dietetic methods, many useful and specific diets are given, as for example the many types of ulcer diets which have appeared in medical literature and been found useful. These are brought together and made available in one place.

I think any medical student would prize this book very highly and use it very much. The practicing physician, I feel, would find it very useful as a desk reference.

R.L.F.

The following footnotes were ommitted in the January, 1951 issue on Dr. Winona G. Campbell, "Read before the Arizona Medical Association Annual Meeting, Tucson, Ariz., May, 1949," and Drs. Chas. A. Janda and Arie C. Van Ravenswaay, "Read before the Arizona Medical Convention, Annual Meeting, Phoenix, Arizona, May, 1950."

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CANCER SYMPOSIUM

On March 1 and 2, 1951, the "Fourth Utah Cancer Symposium" will be presented by the University of Utah Medical School, in conjunction with the Utah Chapter of the American Cancer Society, the Utah State Department of Health, and the Utah State Medical Association. The scientific sessions will be held in the Amphitheater of the new Nurses Home of the Holy Cross Hospital, Salt Lake City, Utah.

The aim of the program is to present information of value to the practicing physicians. This information will be presented in the form of clinics, seminars, talks, conferences, teaching movies, and round table discussions. Dr. Louis A. Buie, from Rochester, Minnesota, will discuss diagnosis and therapy of rectal lesions. Dr. Charles Huggins, from Chicago, will present the problem of prostatic cancer as it presents itself to the general practitioner; he also will conduct a seminar on cancer tests. Dr. Ralph Bowers, from Memphis, will discuss gastric cancer, and an "unknown case" at a clinical pathological conference, together with Dr. Lauren V. Ackerman, author of the well known textbook on Cancer. Dr. L. Henry Garland, from San Francisco, will present the radiologist's aspect of gastric cancer, and conduct a seminar on unusual x-ray films. Dr. Allen Barnes, from Columbus, Ohio, will discuss the position of the general practitioner in the fight against early cervical cancer, and conduct a conference on recent advances in late cancer therapy. Of special interest will be two round table discussions, one on early cancer diagnosis, and another on late cancer therapy. The moderators in these discussions will be Dean John Z. Bowers, and Dr. Maxwell M. Wintrobe; the discussers will be the guest speakers.

Special preparations are being made to entertain the physicians' wives, who are cordially invited to attend. It is planned to have a fashion show, a cocktail party, banquet and other entertainment. The meeting is expected to be a memorable event both for the physicians and for their wives.

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WESTERN CONFERENCE ANNOUNCES THEME

"Circulation" will be the theme for the Second Biennial Western Regional Conference on Anesthesia to be held at the Hotel Del Coronado, San Diego, on April 2-4, 1951. Many leading anesthesiologists and specialists in related fields have already been scheduled for program participation. The program will be presented immediately preceeding and at the same place as the oral examination of the American Board of Anesthesiology. Extensive entertainment events, including attendance at the Jai Alai games in Tijuana, a cruise in the Bay, tours and other entertainment for the ladies, and a Dinner at which Admiral Stanley, former Ambassador to Russia, will speak, have been planned. It is not too early to make your reservations.

Don't miss it! Besides such well known names in anesthesiology as Doctors Macintosh, Dripps, Cullen, Leigh, Dillon, McQuiston, Pender, Scott Smith and Fisher the program is also studded with outstanding scientists in related fields including Victor Hall, M.D., Professor of Medicine, University of Southern California Medical School, Charles P. Baker, M. D., Director of Pathology, Samuel Merritt Hospital, Oakland, Calif., John C. Jones, Los Angeles, Maurice H. Seevers, M.D., Professor of Pharmacology, University of Michigan, Marcus A. Krupp, M. D., Assistant Clinical Professor of Medicine, Stanford University Medical School, William Paul Thompson, M.D., Clinical Professor of Medicine, College of Medical Evangelists and William P. Longmire, Jr., M.D., Professor of Surgery, University of California Medical School at Los Angeles. These outstanding participants on the Scientific Program together with the galaxy of social events planned for those who attend, makes this meeting a number one must on your schedule.

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WOMAN'S AUXILIARY

YAVAPAI NEWS

Mrs. James H. Allen, an outstanding member of the Yavapai Auxiliary for many years as well as being a former state Auxiliary president has been guiding the Yavapai group's activities as the 1950-51 president. Being one of the auxiliary's organizers, Mrs. Allen has served as president several times and has worked in countless other capacities over the years.

The group's most recent project was a benefit dessert bridge and canasta party. The proceeds were used to finance the Yavapai contribution to the Student Nurses' Loan Fund. Other immediate plans include aid in the form of clothing, food, and toys to needy families at Christmas.

Mrs. M. W. Phillips (Prescott)

MARICOPA COUNTY

Mrs. Archie E. Cruthirds, first vice president, presided at the December meeting of the Maricopa County Medical Auxiliary, in the absence of the president, Mrs. Karl S. Harris. The meeting was held in the Good Samaritan Nurses' Lounge.

In preparation for the Christmas party which the Auxiliary is planning for the children at the County Hospital, each member brought a gift for a child, and books for a permanent library. Mrs. J. H. Patterson is going to make a candy cane for each child.

At the conclusion of the business meeting, the nurses presented a Christmas program, introduced by Mrs. Goldenburg, Director of Nurses at Good Samaritan Hospital. Under the direction of Mr. Hollis Dindot, music teacher in the city schools, the nurses sang a group of Christmas carols. Miss Mary Jane Felgar read the lovely Christmas story, "Why the Chimes Rang," and Miss Louise Huber sang a solo. Miss Paula Duffy, costumed as "Mrs. Santa Claus" presented a dance, after which she distributed candy canes from her pack.

After the entertainment, Mrs. J. W. Findley Jr., Hospitality Chairman, introduced five new members with a brief biographical sketch of each. Mrs. F. B. Laneback, and Mrs. J. Edwin Keppel of Mesa; Mrs. C. Thomas Read, Mrs. J. Martinek, and Mrs. James Coffey of Phoenix.

The social hour followed and refreshments were served by a committee headed by Mrs. Frederick D. Baier.

Respectfully submitted,
Mrs. John Eisenbeiss Phoenix

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MEDICAL GROUP HOLDS OPEN HOUSE, SUPPER

Reprinted from Tucson Star

Pima County Medical Society and auxiliary held an open house and buffet supper at the Wild Horse ranch from 5 to 8 p.m.

Hosts and hostesses were Drs. and Mmes. Kirby W. West, Ian M. Chesser, M. A. Carreras, Hollis H. Brainard, Maxwell Palmer, Donald B. Lewis, Darwin Neubauer, S. I. Shapiro, Willard L. Strode, Kenneth Baker.

Drs. and Mmes. Ralph H. Fuller, Hugh Thompson, John Stacey, Arie C. Van Ravenswaay, Harold E. Kosanke, Alex Shoun, Leo Kent.

Reservations were made by 328 local doctors and their wives.

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MRS. ROY HEWITT

President of Pima County Medical Auxiliary

Mrs. Roy Hewitt is President of the Pima County Medical Auxiliary. She was born in Seattle, Washington, but lived in Kansas and Missouri before moving to Arizona in 1924. Mrs. Hewitt attended Kansas State College at Manhattan, Kansas and graduated from the University of Arizona. A year's post graduate work in dietitics was received at the Michael Reese Hospital in Chicago. Before her marriage to Dr. Hewitt in 1934 she worked as a dietitian at St. Mary's Hospital, Tucson, and the Veterans Hospital, Bronx, New York.

She served as 2nd vice-president of the Pima County Auxiliary in 1946 and 1947 was State Bulletin Chairman of the Arizona State Medical Auxiliary.

Mrs. Hewitt was chairman this fall of the annual Silver Tea given by St. Lukes on the Desert, Board of Visitors.

She's Past Placement Chairman and past chairman of Children's Theatre and past chairman of Rolling Library at Pima County Hospital for the Junior League of Tucson.

Left to right: Mrs. L. L. Stolfa, Mrs. Wm. H. Cleveland, Mrs. Clark L. McVay and Mrs. Paul S. Causey, all of Phoenix, Arizona.

VISITING NURSE SERVICE

At the first annual meeting of the Woman's Auxiliary to the Maricopa County Medical Associations, it was decided to do volunteer work for the Visiting Nurse Service.

The Visiting Nurse Service of Phoenix was established in January, 1946. The purpose of the service is to provide part-time bedside nursing care in the home of anyone living in Metropolitan Phoenix, who is under the care of a recognized local physician.

In May, 1949, the Visiting Nurse Service Auxiliary was organized. This is a "booster" group, giving time, money, and energy to the work of the agency. Members of the Auxiliary lend helping hands to routine tasks, guaranteeing the nurses a maximum of time for actual bedtime care. The members prepare supplies, sew, wrap dressings, cut cotton, and contribute typing and filing hours to the clerical division. In addition, they collect magazines and books for the service's lending library and provide a motor corps for driving student nurses to their patient's homes. This year the V.N.S. Auxiliary is preparing bedside trays and potted plants to be distributed to the patients at Christmas.

Members of the Medical Auxiliary have volunteered to assist with these tasks. Two women are giving a half day each week. Mrs. Donald Carlson, who is Health Chairman of the Medical Auxiliary, is in charge of this project.

Respectfully submitted,

Mrs. John Eisenbeiss—chairman
Mrs. L. L. Stolfa—co-chairman
Phoenix

Mrs. John W. Findley, Jr., Phoenix

HOSPITALITY

This year the Maricopa County Medical Society is promoting a "Get Acquainted" program between the wives of doctors recently taken into the County Medical Society and the wives of established doctors. At each meeting several newcomers are introduced. The audience is told where the doctor was born and educated and his field of medicine. We also learn the wife's native state, her places of education and the size of her family. These facts establish a bond among Auxiliary members and offer good conversation material. Thus far seven newcomers have been introduced. They are Mesdames Fred Ewart, John Ford, Robert Ripley, John McKenna, James Barger, Fred Coleman, and John Kennedy.

Mrs. John W. Findley Jr. originated this plan which is working very successfully. Both Dr. and Mrs. Findley were born and raised in Indiana. They were graduated from Purdue University in 1940. Mrs. Findley then worked on the campus at Purdue and later for the C.A.A. as an Airport Traffic Control Tower Operator. She and Dr. Findley were married in 1943.

Doctor Findley received his M.D. at the University of Chicago, interned at Yale, served with the Navy, and spent three years in residency in the Department of Medicine in the University of Chicago's Billings Hospital. The Findleys came to Phoenix in September, 1949. They have two handsome boys, Tom, 5, and Bill, 3.

Left to right: Mrs. Roy Hewitt, President, Mrs. Leo J. Kent, Vice-President, Mrs. Hugh Thompson Legislature Chairman, and Mrs. Richard Hausmann, Program Chairman, all of Tucson. The above women were attending the first general meeting and plans were discussed for the Nurses Loan Fund project for the Community Chest.

Mrs. Findley is active in the Phoenix Symphony Guild, Fine Arts Association, and the Medical Auxiliary. Her work for the Auxiliary has been enthusiastically received; it may be hoped that the program will continue for many years in order that the Maricopa County Auxiliary may become a more closely knit, useful organization.

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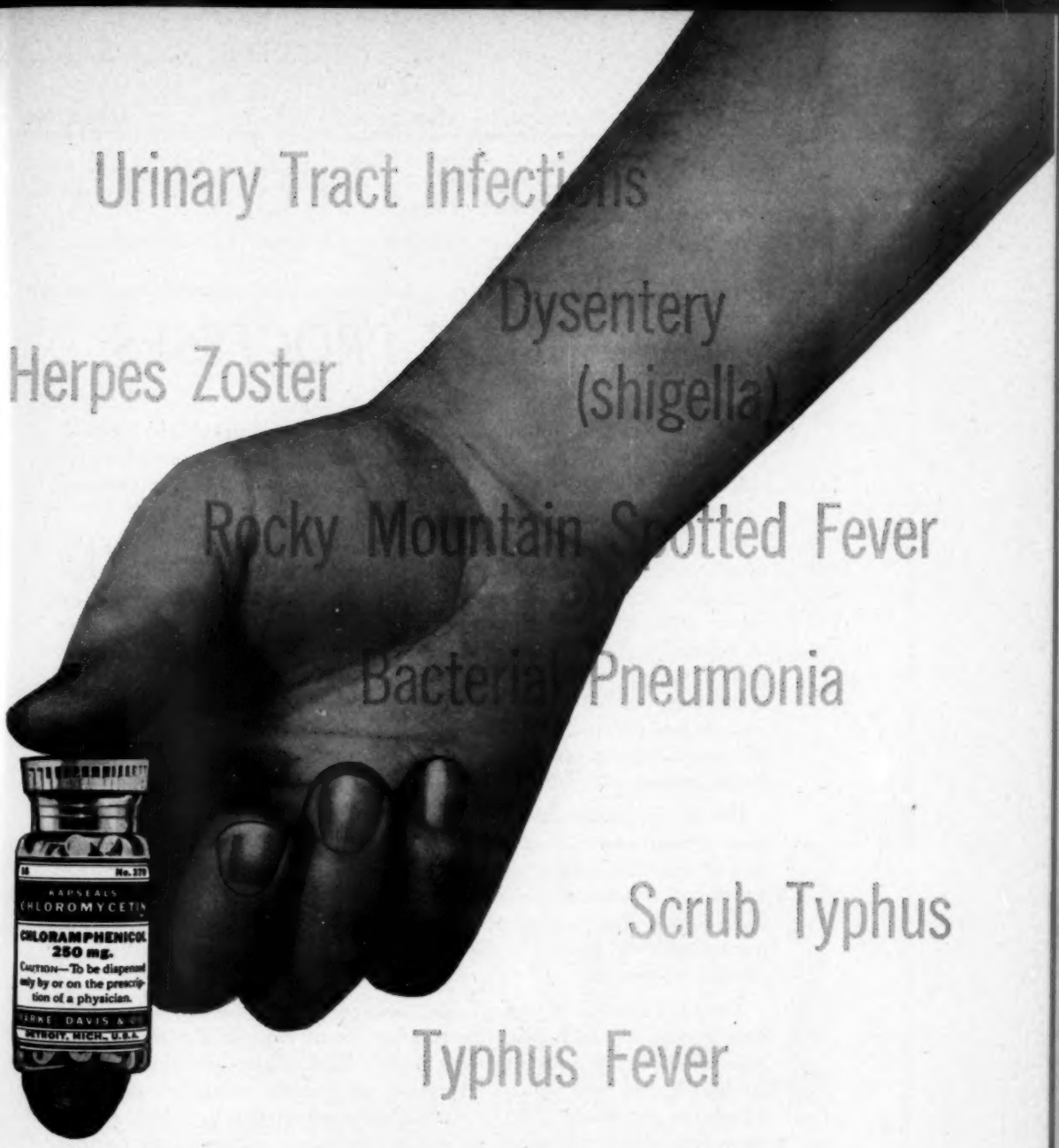

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(1) Ravdin, I. S., and Gimbel, N. S.: Protein Metabolism in Surgical Patients, J.A.M.A., 144:979 (Nov. 18) 1950.

(2) Vars, H. M., and Gurd, F. N.: Role of Dietary Protein in Experimental Liver Regeneration in Nitrogen Balance Study, Am. J. Physiol., 151:391 (Dec.) 1947.

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